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## **The effect of music therapy on spontaneous communicative interactions of young children with cochlear implants**

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**The effect of music therapy on spontaneous  
communicative interactions of young children  
with cochlear implants**

**Dikla Kerem**

**Thesis submitted for the degree of Doctor of Philosophy**

**April 2009**

**Supervisor: Professor Tony Wigram PhD**

**Department of Communication  
Faculty of Humanities  
Aalborg University  
Denmark**



## **Declaration**

I confirm that this thesis and the research it contains has not previously been submitted for examination for an academic qualification, undergraduate, or post-graduate.

Dikla Kerem



## **Abstract**

This investigation examined the effect of music therapy (MT) on spontaneous imitation, initiation, turn-taking, and synchronization of young children, following cochlear implantation. Data were also collected from parents describing their child's engagement in and enjoyment of music in daily experiences before and after the MT intervention.

The subjects were five 2-3-year-old children (4f, 1m) of normal hearing parents with no known disability other than deafness. The study utilized mixed methods and was carried out as an in depth multiple case study, comparing responses within subjects and between conditions. An A-B-A-B crossover design was employed, with subjects randomized as to order of condition (A: four 20-minute weekly sessions of play with 10 minutes directed by the therapist and 10 minutes child-led; B: four 20-minute weekly MT sessions, 10 minutes directed by the therapist and 10 minutes child-led). The researcher served as the therapist in both conditions and employed a flexible protocol for both. Data collection was carried out using video analysis of the MT and play sessions as the main tool, and the non-standardized parent pre- and post-intervention questionnaires and semi-structured interviews as secondary tools.

Analyses of the DVD recordings of all sessions confirmed that MT enhanced the frequency and/or duration of target behaviors to a significantly greater degree than did play. Spontaneous turn-taking was significantly greater during the undirected session part of both the MT and play sessions. No significant differences were found between the mothers' or the fathers' responses from pre to post on the questionnaires. A thematic analysis of the interviews revealed that parents acknowledged the importance of MT and were interested in continuing to apply different music activities.

The findings support the premise that MT, as implemented in this study would have a positive effect on communication outcomes when integrated into a total habilitation program for young children with CI. To realize these benefits, parents and educators need to be given concrete recommendations regarding the exposure of children with CI to music and the use of music for communication as well as the importance of the undirected approach.



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I dedicate this thesis to the five children who were the focus of my study and to their families.



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*Music is love in search of a word*

Sidney Lanier (1842-1881)

from "The Symphony"



# Chapter 1

## Introduction

### 1.1 Context for the study

The communication of newborn with normal hearing (NH) through vocalizations and body language undergoes a transformation when a child reaches three years old and communicates through multiword utterances. This transformation is one of the most complex and amazing developments of the first three years of life (Prizant, Wetherby, & Roberts, 2000). The idea of restoring hearing, and thus, linguistic communication, to children and adults who are profoundly deaf by artificially stimulating the sensory system has progressed over the past 25 years from a futuristic possibility to reality. Thus, the Cochlear Implant<sup>1</sup> (CI) has been a dramatic and exciting breakthrough in the field of hearing and deafness (Northern & Downs, 2002). The CI is a prosthetic replacement for the inner ear (cochlea), a computerized device, which is appropriate for people who have profound bilateral sensory-neural hearing loss, and who receive minimal or no benefit from a conventional hearing aid.

The CI restores audibility (sound awareness); however, since the acoustic input is not the same as that received by a child with NH, it will be necessary for a child who has received an implant to undergo an extensive habilitation program in order to facilitate acquisition of speech, language and appreciation of music. Such a habilitation program consists mainly of visits to the audiologist to maintain and reprogram the device, speech and language therapy, auditory training, parent counseling, involvement in the child's educational program, and sometimes- creative arts therapies.

All habilitation programs emphasize the most important goal of their program, namely, to teach children (or adults) with CI how to use their device to maximize their aural/oral communication ability (Allum, 1996; Christiansen & Leigh, 2002; Clark, Cowan, & Dowell 1997; Katz, 2002). After cochlear implantation, these children, who start off not hearing anything, are able to gain up to 90% of normal hearing. This whole experience of hearing new sounds, in addition to being captivating and exciting, can cause fatigue and confusion because the child may feel overwhelmed by suddenly being bombarded with auditory stimuli. I have seen

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<sup>1</sup> The acronym 'CI' indicates both singular and plural of Cochlear Implant/s.

children, particularly in their first year after implantation, deliberately remove the external part of the CI system in an apparent effort to "turn off" the noisy world and return to their familiar silence. Koestler (2003) referred to this as well in her work with young implanted children, and wrote: "Children with CI get tired of sounds. Sometimes sounds can hurt".

## 1.2 Clinical motivation

The rationale for this study stemmed from the professional knowledge I acquired over the past years as well as my clinical experience with children with CI. My deep commitment was to gain as thorough an understanding and knowledge of the connection between music therapy, music, and children with CI as I could. Personal motivation was yet another factor, namely, my love of music and desire to share this with others.

A number of different factors contributed to the rationale behind this study, as well as current professional arguments and reasons underpinning the relevance and value of music as a therapeutic tool in promoting healthy development in children:

- **Music therapy is appropriate to the developmental stage of these children:** Boxill (1985) states that music therapy offers a non-verbal means of making contact. As such, this treatment is of vital importance to persons who are inaccessible, in varying degrees, through the spoken word because of deficits in communicative skills. This is exactly the situation for children who have just received CI. Following the implantation, they lack speech and language skills for a period of time, until they learn and develop these skills. At this developmental stage they cannot easily request information and clarification of the surroundings. This, in turn, creates dependency on the adults and as a consequence, leads to little exploration of the environment, and lack of self-confidence (Greenberg, 1980). In the transition of these children to the hearing world, music, as a communicative media, may serve as a bridge between the world of silence and that of sounds. In music therapy, musical interactions may enhance opportunities for practicing normal communicative interactions through a non-verbal means, generating feelings of success and well being (Boxill, 1985, p. 17), which may help them gain some self confidence.
- **Music therapy enables reinforcement of non-verbal communication:** Children

with CI are under constant pressure to speak from the adults in their environment, who reinforce them mainly for their verbal communication. Their goal is to help the child close the communication gap resulting from his/her initial deafness. Music therapy enables reinforcement of the children's non-verbal communication and can lessen the stress on them for verbal exchange and response. Another aspect relating to communication is the fact that the interaction between a mother with normal hearing<sup>2</sup> and a child who is deaf, as reported in some of the literature, is generally poor due to the child's lack of linguistic communication (e.g., Meadow-Orlans, 1996; Prendergast & McCollum, 1996). The relationship developed between therapist and child in the music therapy sessions may be instrumental in introducing the child to a more reinforcing avenue of communication.

- **Music therapy enables the expression of emotions and the discovery of the non-verbal voice:** Music is an additional communicative expressive channel through which these children can express emotions, and discover their voices without the demands of speech and articulation. Sekeles (1996) refers to this point and writes: "The human voice is endowed with a flexibility which allows it to express emotion, even without the use of specific words. The musical parameters which influence emotion can be expressed vocally by means of changes in tempo and continuity, accentuation, pitch and range, timbre and dynamics" (p. 31). Robbins and Robbins (1980) indicate that vocal exploration develops vocal awareness and ability that in turn brings pleasure and joy and increasing vocal confidence. The latter is particularly important for children with CI who need a variety of vocal experiences as a foundation for their ongoing development in terms of speech and articulation.
- **Music therapy enables controlled exposure to the world of sounds:** In a playful communicative experience such as music therapy, children with cochlear implants can experience controlled exposure to the world of sounds by exploring musical parameters such as rhythm, pitch, loudness, timbre, accent, etc., which are also components of language. The music therapist can present the musical parameters so that the emphasis is on one parameter rather than the way music is usually presented - with all parameters combined. Thus, the child is less

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<sup>2</sup> From here-on, for ease in reading, parent/s with normal hearing will be referred to as 'hearing parent/s'.



overwhelmed and the music therapist may actually reinforce the speech therapist's work with the child. Music may also act as a motivator in this process of practicing new concepts of sound (Amir<sup>3</sup>, 1982).

- **Music therapy offers a unique opportunity for coping with hearing-related tasks:** In a client-therapist relationship, within which the therapist provides trust, security, empathy and support, the children may increase their self-esteem by coping with and accomplishing simple hearing-related tasks. In addition, the inherent, inborn musicality, the “music child”, which is suggested to exist in every child, no matter how disabled he/she is (Nordoff & Robbins, 1977), may be further reached and developed after the implantation. The children can then establish a new self-confidence in their musical abilities (Radbruck, 2001).

### 1.3 Personal motivation

Additionally, there were also personal reasons for my motivation for, and interest in this area of research:

- **Past clinical experience:** As in my past clinical experience with children with hearing impairments (HI) and my masters' dissertation which focused on this topic (Amir, 1982), my experience with children with CI has taught me that they are enthusiastic and musically communicative<sup>4</sup> in the framework of music therapy. That was evident at “Shema”- a center for children with HI in Haifa, where I volunteered to work with several school-age children with CI, and at “Micha”- Society for Rehabilitation of Preschool Deaf Children in Haifa, where I worked with a young girl with CI. This clinical work was done in order to explore more in depth what I wanted the focus of my doctoral study to be. As Gaston (1968) said: “Whatever expands the sensory world of the impaired has far greater importance than would the same sensory expansion for the unimpaired” (p. 121).
- **The importance of music in my life:** For me, life is music and music is life. Deafness prevents the enjoyment of the wonderful gift called music. Life with

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<sup>3</sup> Amir was my maiden name. This topic is covered in my master's dissertation: “Auditory training through music as a therapeutic tool for hearing impaired preschool children” (Amir, 1982). See also the dissertation's digital form:

<http://innopac.library.drexel.edu/search/Y?SEARCH=amir%2C+dikla&searchscope=9&SORT=D>

<sup>4</sup> Musical communication is reflected in the musical elements which are beat, meter, rhythmic structures, accents, tempo, pitch, melodic range, volume-dynamics, as reflected in the way a client plays/vocalizes/sings, as well as in the musical interaction (Sekeles, 1996)

music is one of the miracles made possible by the cochlear implant. Thus, I was motivated to expose children with CI to music in a way I thought would be both appropriate to their developmental level and different from the way they would experience it at home. I also felt it could be an extraordinary experience for them.

- **Evidenced-based practice:** One process first developed in medicine and then applied to psychotherapy in an effort to strengthen the research-practice relationship is evidence-based practice (McKinney, 2005; Wigram, Pederson, & Bonde, 2002). This relates to an interest of mine that emerged from my need for demonstrable outcomes from a music therapy intervention. I was motivated to carry out systematic case studies that would investigate the effectiveness of individual music therapy on the basis of measurable outcomes using a quantitative investigation, enhanced by some additional qualitative enquiry.

#### 1.4 The focus of the study

A review of the literature reveals that children with severe to profound hearing loss who have undergone cochlear implantation can enjoy music and music activities (see section 2.3.4). Most of the current research, however, emphasizes perception of music by adults and school-age children with CI, and their involvement with and enjoyment of music, while only a few focus on music habilitation programs. There is a paucity of literature or even publications of anecdotal findings about young children with CI. In addition, no research has been carried out in relation to the influence of music therapy on this age group, following cochlear implantation. Several studies and anecdotal reports indicate increased communicative responses (e.g., turn-taking, imitation, and initiation) as a result of music therapy carried out primarily with children with developmental disabilities (see section 2.2.9). The purpose of this study, therefore, was to investigate the effect of music therapy on spontaneous communicative interactions (imitation, initiation, turn-taking, and synchronization) of 2-3-year-old children following cochlear implantation. These behaviors are essential prerequisites to developing language. An additional purpose was to gather information from each parent regarding the child's engagement in and enjoyment of music in daily life before and after the music therapy intervention.

The primary research question and its sub-question as well as the additional questions relating to the parent questionnaires and interviews are presented in section 2.4.

### **1.5 Overview of thesis**

Chapter 2 provides a review of the relevant literature to give a theoretical framework upon which this study is based. It begins with the literature on hearing impairments and cochlear implants, communication of children with NH and communication of children with HI, and their interaction with their mothers. The communicative interactions are investigated in this study and the importance of early intervention is considered with some attention to the relevance of play. The review continues by selecting relevant studies from the wide field of music and communication and music and hearing impairments, focusing in on music and cochlear implants relating to adults and children. Finally, detailed attention is given to the specific literature on music therapy for children with CI, which therefore provides the foundations for the research questions postulated for this study.

Chapter 3 provides a detailed description of the research methods employed in this study. The research design, population sample, equipment, and the procedures undertaken with the children as well as with their parents are explained in detail. The standardized assessment/measurements tools and the non-standardized ones that were used for data collection are described. The spontaneous communicative interactions selected as target behaviors are defined and the general principles and procedures of the protocol used in the music therapy and play sessions are presented. The format of the sessions is described as well as the three types of data that were collected and analyzed: data gathered from video analysis, parent pre- and post-intervention questionnaires and data collected during parent interviews.

Chapter 4 presents the pooled results of the target behaviors for the five children who participated in the study. First, results related to reliability are presented, followed by the main effects and interactions from session data analysis. The chapter continues with the results from the parent pre- and post-intervention questionnaires and the supplementary qualitative analysis of parent interviews. The last section presents a case study narrative on each child based on the free-text answers from the parent questionnaires and interview material.

Chapter 5 discusses the findings of this study in relation to findings from previous studies that were presented in the theoretical framework in chapter 2 or from more recently studies. The limitations of the study are discussed, and the implications of the findings for clinical practice, for families of children with CI, and directions for further research are considered. This chapter ends with a reflection on the research

process.

The references mentioned throughout the text are presented as well as appendices which provide all relevant and necessary information regarding tools that were used in this study, raw data and other related information (some of which is presented in Hebrew as well).



## **Chapter 2**

### **Literature Review**

#### **2.1 Hearing impairments and cochlear implant**

##### **2.1.1 Hearing impairments**

According to the reviewed literature of some of the key writers in the subject of hearing impairments (Boothroyd, 1988; Flexer, 1999; Katz, 2002; Northern & Down, 2002), it seems as if there are no changes since the researcher has written her thesis (Amir, 1982; Amir & Schuchman, 1985) in terms of definition of hearing impairment, types, degrees of hearing loss, configuration and causes<sup>5</sup>. The changes are the more advanced solutions which are offered today to people with HI.

Northern and Downs (2002) state that the definition of a hearing loss in any given case lies in the entire diagnostic process, which includes not only hearing tests but requires measurements of a child's receptive and expressive language, vocalization and speech levels, and behavioral functioning evaluations. The authors propose a realistic definition of hearing loss in children, namely: "A handicapping hearing loss in a child is any degree of hearing that reduces the intelligibility of a speech message to a degree inadequate for accurate interpretation of speech or as to interfere with learning" (p. 23). In the learning process of children, too many variables are present: amount and quality of parental stimulation, innate intelligence, age of onset of hearing loss, personality factors, and socioeconomic status. Therefore, a 15-dB loss may be a handicap to one child, whereas a 25-dB loss will not handicap another (Northern & Downs, 2002).

##### **2.1.2 Cochlear Implant (CI)**

A cochlear implant is a prosthetic replacement for the inner ear (cochlea), a computerized device that contains a current source and an electrode array that is implanted into the cochlea; electrical current is then used to stimulate the surviving auditory nerve fibers which transfer the acoustical information to the brain, thus creating an effect similar to hearing (see section 2.1.2.1). A CI is appropriate for

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<sup>5</sup> Basic concepts in acoustics, audiology, and hearing impairment are covered extensively in the researcher's master's dissertation- Amir, 1982.

people who have profound bilateral sensory-neural hearing loss and who receive minimal or no benefit from a conventional hearing aid (American Speech-Language-Hearing Association [ASHA], 2004; Gfeller, 2001; Stordahl, 2002).

Although some individuals with sensory-neural hearing losses can benefit from hearing aids (Tyler & Fryauf-Bertschy, 1992), mere amplification may not always be helpful. Those persons with profound losses, particularly in high frequencies, may receive greater benefit from a cochlear implant (Gfeller, 1998).

There are several differences between a hearing aid and a cochlear implant. Hearing aids work well with conductive or sensory-neural loss as long as there is enough residual hearing to effectively process the output of the hearing aid. Hearing aids amplify sound, while a cochlear implant is an electronic device that provides artificial electrical stimulation to the auditory nerve (Sternberg, 1998; Stordahl, 2002). It delivers only part of the tonal sound signal. Thus, the device does not provide a true replica of the sound heard by people with NH (Gfeller, 2001; Stordahl, 2002). Gfeller (2000) adds that a cochlear implant transmits information only to one side of the head, thus creating a difficulty to locate the sound source<sup>6</sup>.

Today, implant centers around the world use devices supplied by three implant manufacturers: Cochlear, Advanced Bionics, and Med-el. Although each internal device has unique characteristics, the primary difference between the systems of the three manufacturers is in the way that the external processor codes the incoming sound into electrical signals (Sternberg, 1998). While the implant does not completely restore hearing, most recipients find that they are able to receive significant auditory clues, enabling them to speak and understand oral communication.

#### **2.1.2.1 CI components and pathway of stimulation**

The cochlear implant has several components which work as follows (see Figure 2.1 below):

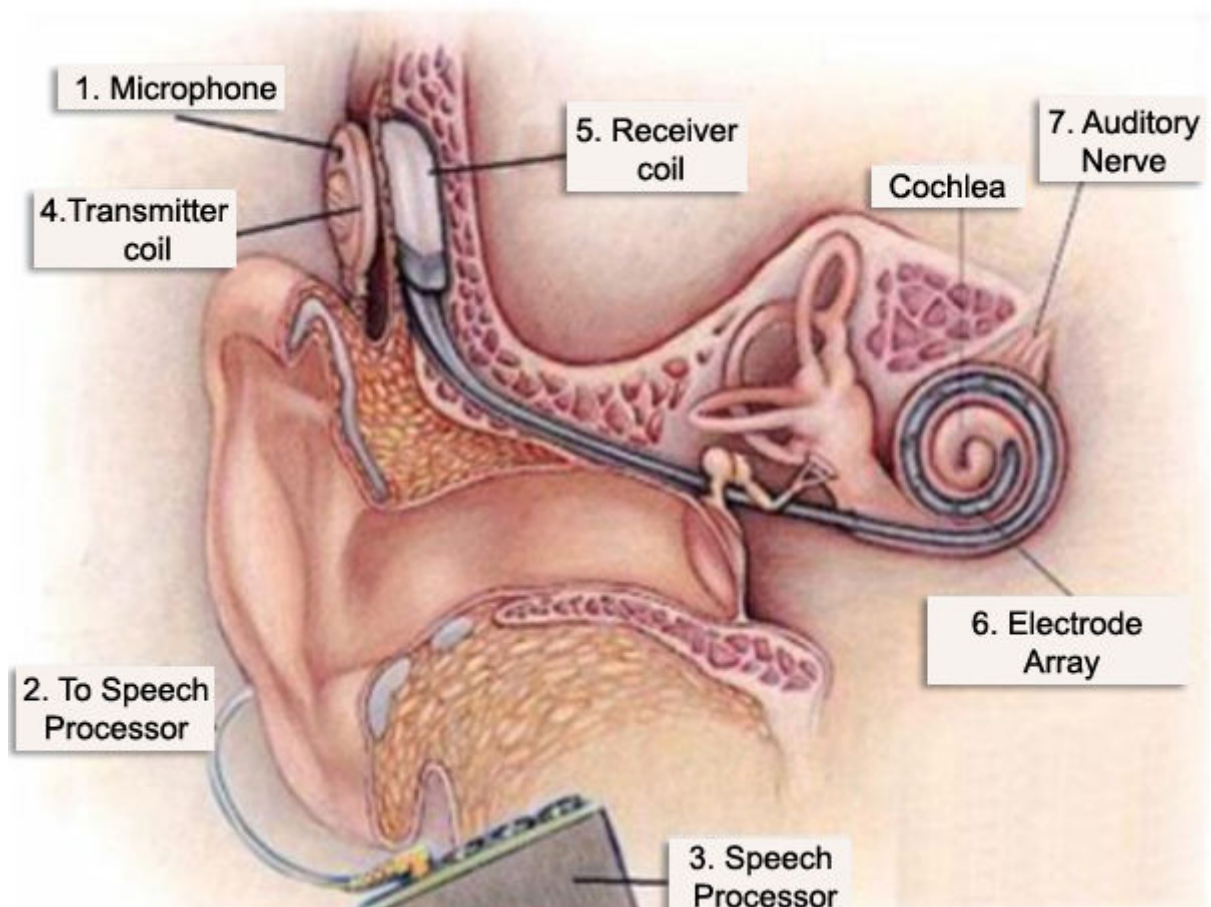
1. A small microphone picks up sounds in the environment.
2. The microphone sends the sounds to the speech processor.
3. The speech processor amplifies, filters, and digitizes sounds into coded signals.
4. These coded signals are sent from the processor to the transmitting coil via a

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<sup>6</sup> Although implants are done monaurally, research is taking place now on binaural implants.

small wire.

5. The transmitting coil sends the signals across the skin to the implanted receiver/stimulator via an FM radio signal.
6. The receiver/stimulator delivers the correct amount of electrical stimulation to the electrode array in the cochlea.
7. The electrodes along the array stimulate the remaining auditory nerve fibers in the cochlea. The resulting impulses are sent through the auditory system to the brain for interpretation.



**Figure 2.1. Cochlear implant system**

(Available from [http://helios.snu.ac.kr/sub\\_02\\_02-eng.html](http://helios.snu.ac.kr/sub_02_02-eng.html))

Today, cochlear implant devices are very sophisticated. The multi-channel implant stimulates the hearing nerve in a variety of places to give information about pitch, which is essential for understanding speech. The externally worn processor is



designed to incorporate advances in technology, so there is no need to wait for next year's upgrade.

The sooner the person receives the implant after becoming deaf- the better he/she will do with the implant (Hammes et al., 2002; Huston et al., 2003; Kirk et al., 2002; McConkey et al., 2004).

Several additional factors affect children's performance with cochlear implants, including age at onset of profound deafness, age when the child receives the implant, status of the cochlea, amount of residual hearing prior to implantation, presence of additional disabilities, and the child educational environment (Katz, 2002).

#### **2.1.2.2 Candidacy criteria for implantation**

Cochlear implant candidacy criteria have evolved over time as advances in cochlear implant technology produced subsequent improvements in performance outcomes. At any point, however, candidacy revolves around three basic questions (American Speech-Language-Hearing Association [ASHA], 2004):

- Is physical implantation of the device possible and/or advisable given the medical status of the patient?
- Is it likely that an individual will receive more communication benefit from a cochlear implant than from a hearing aid or, alternatively, from no hearing prosthesis at all?
- Do the necessary supports exist in the individual's psychological, family, educational, and rehabilitative situation to keep a cochlear implant working and integrate it into the patient's life? If not, can they be developed?

The general questions listed above require evaluation of the patient's medical, audiological, and psychosocial/habilitative condition. An important aspect of cochlear implant candidacy that is much more difficult to define than the audiological or medical evaluation is the psychosocial assessment that includes child's developmental and educational evaluations as well as family assessments. The family's anticipation of CI surgery and the natural hope for a positive outcome introduces stress into the lives of the family. Counseling may generate realistic expectations regarding performance outcome with the implant. The choice of a CI for

a child is usually associated with the choice of spoken language as the primary communication mode of the child who is deaf and family.

#### **2.1.2.3 The implantation surgery**

The surgery is performed under general anesthesia. Since placement of the internal components within the inner and middle ear requires drilling near the facial nerve, this nerve must be monitored to ensure that it is not compromised during surgery. The surgery takes about four hours. The child usually stays overnight at the hospital. Although the rate of complications associated with cochlear implant surgery is very small and post-implant complications are rare, there are certain risks involved in both the surgical procedure and postoperative period. As with any type of surgery, there is always the risk of a problem with general anesthesia, or other risks such as immediate postoperative bleeding and/or infection. The implant surgery may also result in injury to the facial nerve, postoperative dizziness, and other rare complications. There are also some long-term considerations. Despite the fact that cochlear implants are extremely reliable and designed to last a lifetime, device failures do occur in less than 2% of the population. They can result in either a change in hearing status or a total lack of auditory stimulation. If device failure is confirmed, re-implantation should occur as soon as possible. Post-reimplantation results are typically good (American Speech-Language-Hearing Association [ASHA], 2004; Cohen, 1998; U.S. Food and Drug Administration [FDA], 2007).

#### **2.1.2.4 Postoperative management and habilitation for children with CI**

About three to four weeks following surgery, the patients return to the audiologist for initial programming of the cochlear implant. By then, the swelling around the incision is reduced and healed. This enables the magnet to adhere properly. The implant activation's procedures depend on the patient's age and the type of device that was implanted. The initial programming for all types of devices starts with determination of the softest sounds that can be heard from each of the electrodes. This level threshold is recorded on the computer software program. This procedure is followed by determining the upper level of stimulation for each active electrode. Depending upon the type of device used, level of stimulation is increased until the patient reports the sound is "more comfortable" or is loud but comfortable. This is true for adults. With little children, it is almost impossible to get precise mapping data because they

typically cannot report what they hear. Many clinics use electrophysiological data (often times gathered in the O.R. at the time of the surgery) to establish the initial maps. The audiologists then rely on careful observation and tedious "play audiometry" or visual localization responses to fine tune the map. Their goal is to determine the softest sound the child can hear with each electrode (or group of electrodes) and then find the highest stimulation level that will not cause obvious discomfort (by observation and parent/teacher reports). The final psychophysical data are then used in the program for the speech-processing strategy. In most cases, the patients can begin using the CI after the initial programming session (Katz, 2002). This session is usually very exciting, especially for the parents. Since this is the first time the child has experienced hearing, the responses vary from one child to another and can range from laughter to tears, from panic to joy, and from surprise to indifference (Sternberg, 1998). For the next three months, children return for continuing programming their speech processor twice a month (most of the time), once a month for the next three months, and then every six to twelve months.

According to Barker, Dettman, and Dowell (1997), rehabilitation aims to encourage reacquisition of lost communication skills. For the adult who acquired hearing loss, the CI might be expected to assist rehabilitation by restoring an auditory percept. This differs from providing a habilitation program for a young child who received a CI. The clinician's role is then "to facilitate acquisition of listening, speech and language in a normal development order" (p. 171). The importance of a multidisciplinary habilitation process for children with CI cannot be overstated. Its aims are complex and holistic and it must be meticulously implemented if the child is to obtain maximum benefit from the device. There must be collaboration between a clinical facility providing medical and technical support and the educational and training facilities. The habilitation includes training in the perception of speech and non-speech acoustic signals, speech production, and receptive and expressive language enrichment. Strong parental involvement as well as coordination among all of the child's teachers, therapists and care givers is essential. In general, the habilitation procedures used with children with CI are similar to those used with children who have hearing aids. Two primary differences between techniques used with children with hearing aids and with children with CI is that material used with implanted children often contain high-frequency information. Additionally, therapists often have greater expectations for children with CI (Allum, 1996; Christiansen &

Leigh, 2002).

The ultimate goal of all speech and language habilitation programs after pediatric cochlear implantation is to have a hearing-speaking individual. The outcomes after cochlear implantation vary due to uncontrolled factors such as the intactness of pathways at and beyond the auditory nerve as well as decisions of parents and professionals such as the implant technology, age of implantation, pre-implantation reinforcement of residual auditory sensitivity, and choice of language modality (Marschark & Spencer, 2003).

Barker, Dettman, and Dowell (1997) state that the habilitation approaches used with children with hearing impairments range along a continuum from highly visual (such as sign language) to highly auditory (such as auditory-verbal). They write:

*Sign Language of the Deaf* is a gestural system that has a unique syntactic structure and no spoken correlate. *Signed English* encodes language with a specific sign for every individual word and morphological marker. *Total communication* involves the use of Signed English, lip-reading, and listening for the hearing-impaired person to perceive language. *Cued speech* employs a series of hand signals to indicate certain phonetic features (e.g., tongue position for vowels) which are not visible when lip-reading. The *Oral/Aural* approach emphasizes the optimum use of residual hearing in conjunction with lip-reading cues. The *Auditory-Verbal* approach emphasizes learning language and speech through the exclusive use of residual hearing and the deemphasis of lip-reading cues (p. 173).

In Israel, the oral/aural approach, auditory-verbal, and total communication are the only ones in use in the different educational settings. Pre-implantation, each child will have been educated according to one of these educational procedures. As with the old oral versus manual controversy in the education of the deaf (Connor, Hieber, Arts, & Zwolan, 2000), there has been a debate whether children with CI will benefit most from a program that offers spoken language only (such as oral or auditory-verbal), or from a program that includes sign language which provides redundant linguistic speech to facilitate comprehension (Marschark & Spencer, 2003). Marschark and Spencer (2003) indicate that the findings in the research literature are controversial regarding this issue (for review see p. 438 in their book) and summarize that children

with CI improve their speech and language skills regardless of the type of language intervention. When compared to their hearing peers however, most children with CI whether in an oral, auditory-verbal, or total communication environment tend to lag in language skills after implantation. The authors add that the identification of interaction between language mode and factors such as age at implantation, as well as emerging reports of the progress of children using cued speech, suggest a need for continued objective assessment of this issue. Additionally, the status of the child's unimplanted ear has been receiving increasing attention in the audiology literature as another important element in speech and language development.

In an unpublished paper on educational audiology submitted to the Board of Education in Israel, Halpern (2004)<sup>7</sup> relates to the considerations in choosing the habilitation program for children with CI, and points out that children who were orally educated pre-implantation, will obviously continue to be educated by the same approach post-implantation. The dilemma arises in regard to children who were educated in a total communication program before the implantation:

1. For those below two years, the oral approach is recommended. However, it is of paramount importance to monitor the pace of communicative development and remain prepared to change the communicative approach if the oral method doesn't allow for appropriate language development.
2. For those who relied mainly on sign language pre-implantation, it is recommended to gradually integrate the use of oral communication while emphasizing auditory learning of speech and environmental sounds.

Halpern states that the functional level of a child with CI is unpredictable, but the probability of successful speech and language development will be enhanced by the following factors:

1. Short duration of deafness;
2. Early diagnosis of the hearing impairment followed by an immediate use of amplification and language stimulation (spoken or signed);
3. Early implantation;
4. Early and extensive auditory experience;
5. Good cognitive and attention skills;

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<sup>7</sup> Dr. Orly Halpern, Ministry of Education, Israel; Tel Aviv University, Israel (personal communication, March 16th, 2009). E-mail: hpinny@012.net.il

6. Educational and home environment which provide intensive exposure to spoken language;
7. Intensive auditory-oral training.

Further perspectives and research related to these issues can be found on [http://convention.asha.org/handouts/1420\\_0162Scott\\_Susanne\\_059135\\_Nov14\\_2008Time\\_011840PM.pdf](http://convention.asha.org/handouts/1420_0162Scott_Susanne_059135_Nov14_2008Time_011840PM.pdf)

## **2.2 Interaction and communication**

The topic of communication has been largely covered in the literature but will be only briefly introduced here.

The term *communication* has been widely defined in the literature. The National Joint Committee for the Communicative Needs of Persons with Severe Disabilities (1992) defines communication as-

Any act by which one person gives to or receives from another person information about that person's needs, desires, perceptions, knowledge, or affective states. Communication may be intentional or unintentional, may involve conventional or unconventional signals, may take linguistic or nonlinguistic forms, and may occur through spoken or other modes (p. 2).

Communication comes from the Latin word 'communicatio' that means message or 'communicare' that means to share. Interaction and communication are mainly used as synonyms, but communication is an exchange, whereas interaction means reciprocal influence (Ridder, 2003). Goldstein and Kaczmarek (1992) state that communication skills provide the primary means for controlling the social environment (siblings, parents friends, or others) and note that surprisingly, the remediation of deficits in social skills as well as the remediation of social skills has been studied separately. They write:

Divorcing communicative interaction from social interaction is a difficult if not impossible task. Communicative behavior is usually considered a subset of social behavior. But because communication refers to the process of exchanging information using both symbolic means (e.g., facial expressions, gestures, movements, postures), almost any attempt to facilitate social interaction results in improved communication (Siegel-

Causey & Guess, 1989). The distinction between the two becomes fuzzier when we consider the myriad of ways to segment and describe social interchanges (p. 83).

Communication skills are pre-requisites to developing and mastering language (Chiswanda, 1997). One of the factors involved in developing effective communication skills is our hearing mechanism. Hearing is one of the building blocks on which our intricate human communication system was constructed. Several studies have already proved that the human cochlea has normal adult function after the 20th week of gestation, and that the fetus could indeed hear the mother's voice and other voices (Northern & Down, 2002, p. 134). Northern and Down state that "this innate discrimination that sub-serves the preference for the mother's voice requires the auditory competencies of discriminating rhythm, intonation, frequency variation, stress (supra-segmental aspects of speech), and phonetic components of speech (linguistic aspects)" (p. 131).

Klinger and Dawson (1992) refer to the fact that reciprocal social and communicative interaction develop upon the ability to understand contingency, i.e., the fact that actions of others affect oneself, and that one's own actions affect others. Through contingent, predictable, permanent, and repetitive interactions with the meaningful persons in their near environment, infants develop normal emotional development. They then feel a sense of control over their environments and begin to perceive themselves as effective social agents (Dromi & Ringwald-Frimerman, 1996; Klinger & Dawson, 1992).

This study focused on several aspects of prelinguistic communication. According to Wetherby and Prizant (1992), prelinguistic or preverbal communication refers to gestures and/or sounds that are used as signals to communicate but are not referential or symbolic. The existing research indicates that communication development involves continuity from preverbal communication through linguistic communication, and the development of preverbal communication is a necessary precursor to the development of intentional use of language to communicate (see Wetherby & Prizant, 1992, p. 221, for reviews). Yoder and Warren (1993) relate to the importance of prelinguistic communication and note that past research has demonstrated a relationship between prelinguistic communication and expressive and receptive vocabulary size (see p. 53, for reviews).

According to McLean (1990), social-affective exchanges, which occur between the infant and the caregiver, serve as a foundation of the social or pragmatic aspects of communication. Therefore, the next section will focus on parent-child interaction in general. This will be followed by a section on the communication and language development of children with normal hearing from the ages of 0 to 3 years. Lastly, some literature on the interaction between hearing parents (mostly mothers) and their children who are hearing impaired will be presented as well as the communication development of these children.

### **2.2.1 Parent-child interaction**

The first communication system between the child and his/her parent consists of a series of interactions. Interaction is a “Reciprocal action; action or influence of persons or things on each other” (Shorter Oxford English Dictionary, 2002, p. 1398), or more specifically, a process during which the behavior of an individual affects how another individual behaves, which in turn affects how the former individual behaves (Thompson, Felce, & Symons, 2000). Bowlby (as cited in Brazelton & Cramer, 1990) used this term to describe parent-child communicative relationship. Parent-child relationship is perceived as “interaction” because they have mutual and prolonged influences. The nucleus of these interactions are the developmental tasks of each participant, personal tasks (such as learning to eat solid food), and mutual tasks (such as learning to breast-feed and to suckle) (Harel, 1995). According to such a model, the emphasis is on the mutuality of influences in contrast to earlier models that emphasized the influence of the parent on the child. In an interactional model, every participant is influenced and influences, and in such a way each one changes, so that in the next meeting between them, the interaction will be somehow different. Thus, both participants are going through a process of development and change. This is the transactional model (Sameroff & Chandler, 1975). For example, it is possible that the over-intrusive behavior of the mother is a reaction to the passivity of the child; or the child behaves in a demanding manner because the mother is indifferent to his/her signals if given in a more restrained way (Biringen & Robinson, 1991).

Most studies have collected data on the mothers-children interaction rather than fathers, due to the fact that most often the available parent for observation is the mother. That does not mean that the father’s role is less important (Shonkoff & Meisels, 2000).



The individual characteristics of the child and parent relate to the formation of interactional patterns. Stern (1977) states that “the infant arrives with an array of innately determined perceptual predilections, motor patterns, cognitive and thinking tendencies, and abilities for emotional expressiveness and perhaps recognition” (p. 10). According to the infant’s coping behaviors, the mother knows when he/she is ready for interaction. Other studies mention the physical appearance of the infant as a variable that affects maternal responsiveness. The influence of the maternal characteristics on interaction has been examined also. Studies have found that the mother’s increasing importance as a reinforcer of behaviors is one indicator that the infant has learned to expect rewards from environmental interactions, which is the basis for learning (Shonkoff & Meisels, 2000). Zeanah (2000) indicates that “with few exceptions, as goes the relationship, so goes the infant’s development” (p. 223). Mutual regulations and adaptations are essential for optimal interactions. In addition, infant attachment classifications are stable over time and predictive of subsequent infant and parent behavior (attachment theory, Bowlby, 1969, 1982).

The reciprocity that develops as both partners in an interaction respond and adapt to each other is the basis for the mutually satisfying relationship between the parent and the child. This process of reciprocity is described in many ways, for example: Stern (2000) discussed affective attunement; Brazelton (1988) wrote about the reciprocity model as a feedback process that allows for flexibility, disruption, and organization; Barnard et al. (1993) suggested the term ‘mutually adaptive dance’, and Trevarthen (1980) discussed intersubjectivity (see section 2.2.2).

Infant-parent relationships as a whole create a gestalt, which is more than the sum of its characteristics (Sroufe & Fleeson, 1988).

### **2.2.2 Interaction and communication development of children with normal hearing (0-3 years of age)**

This section will present a short overview of the developmental sequences through which children with normal hearing (NH), ages 0-3 (the children's age in this study), develop communication. It will focus primarily on the first two years of life due to its relevance to the pre-linguistic communicative stage of the children in this study.

The research on this topic is vast (Bates, O'Connell, & Shore, 1987; McLean, 1990, for reviews) and points out that communication development is closely related to social-cognitive development (Prizant & Wetherby, 1990; Prizant & Meyer, 1993).

The social-affective exchange between the infant and the caregiver serves as the basis for the social or pragmatic aspects of communication (McLean, 1990).

In the first few months of life, the infant's readable signs such as facial expressions, vocalizations, body postures, and even the skin color, though not yet deliberately produced on the part of the infant, all serve as communicative functions to the caregiver, who interprets these signals and contingently responds to the behavior to regulate the infant's physiological and emotional needs (Zeanah, 2000). This is the *perlocutionary* or the *pre-intentional stage* (Bates, Camaioni, & Volterra, 1975).

An important social gain at the age of two months is the infant's ability to achieve eye-contact with the caregiver (Wolff, 1966). Stern (1974) refers also to the dyadic structure of social-interactive exchanges between the infant and the caregiver through the establishment of eye-contact and mutual gaze. In addition, Brazelton and Cramer (1990) indicate that the caregiver's tone of voice alerts the infant's attention. The infant may calmed down on hearing the caregiver's voice and touch and focus on the caregiver's face, thus creating early states of joint attention and transactional<sup>8</sup> patterns of cycles of affective engagement and disengagement. Trevarthen (1979, 2001) claims that infants are born with the capacity for intersubjectivity- the inherent ability to relate to and communicate with people (*primary intersubjectivity*), that has to do with shared meanings between individuals, or as Adamson and Bakeman (1982) call it- the phase of *affective reciprocity*. In this phase, affective information is shared without the infant being aware of the differentiation between self and other.

From 3-8 months of age, infants' communicative skills further develop as well as increased mobility and exploration of the environment. The infant is involved in increased social engagement with the caregivers, expressed in a greater ability to participate in reciprocal vocal and action-based turn-taking sequences, which are precursory to later communicative reciprocity (Bruner, 1981). The shared emotional experiences with the caregiver lead to the infant's awareness that his/her behavior can have an effect others (McLean, 1990). By 6-12 months, the phenomenon of *referential look* (Newson, 1978) is developed, when the infant shows personal interest for discrete objects by looking at a specific object rather than the earlier global visual scanning in the environment. At this stage, the infant demonstrates the ability to

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<sup>8</sup> Sameroff (1975) proposed a "transactional model" of infant development, which recognizes the "continual and progressive interplay between the organism and its environment" (p. 281).

alternate the gaze between an object and the caregiver and vice versa (Masur, 1990). Thus, *joint attention*<sup>9</sup> (or 'joint visual attention') is established between the infant and the adult, which either of them may initiate. This change in behavior is sometimes referred to as *secondary intersubjectivity*<sup>10</sup> (Trevarthen & Hubley, 1978), where "the topic shifts from two-person communication centered on self to a two person communication regarding a third event" (Kasari, Sigman, Yirmiya, & Mundy, 1993, p. 202). Many times, the caregiver provides a label for the object or event of mutual interest, thus promoting future efficient lexical learning (Bruner, 1975).

A major development in communication occurs in about the last three months of the first year- the development of *intentional communication* (Zeanah, 2000) or the *illocutionary phase* (Bates et al., 1975). The infant starts using preverbal gestures and vocalizations<sup>11</sup> to communicate intentionally in order to affect other's behaviors. Bruner (1981) suggested that there are three innate communicative intentions:

- (a) Behavior regulation- including signals to regulate another person's behavior in order to request, reject, or protest an object or action;
- (b) Social interaction- including signals to draw another person's attention to oneself for affiliative purposes such as greeting, calling, etc.
- (c) Joint attention- including signals used to reference another person's attention to comment on objects and events.

Bruner (1975) discusses the relation between the emergence of speech and the development of *joint attention* and *joint action*, i.e., the concurrent focusing of both caregiver and infant on an object or the collaborative performing of a task, respectively. Bates, Bretherton, Camaioni, and Volterra (1979) state that there are two distinctive communicative functions emerging at the phase of intentional communication: *Proto-declarative* (pointing and vocalizing) and *proto-imperative* (manipulating and controlling other's behaviors). Stern (2000) indicates that infants are far more adept at communicating emotions than specific intentions around the end of the first year. In addition, by the age of 12 months and continuing to the second year, the prelinguistic communication of the typically developing child progresses to linguistic communication. This is the most important landmark of the second year-

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<sup>9</sup> *Joint attention* is also called 'shared', 'mutual', or 'coordinated attention' by different authors (see Kim, 2006).

<sup>10</sup> See also Stern's discussion on intersubjectivity (Stern, 1985, pp. 124-137).

<sup>11</sup> See sections 2.2.5~ 2.2.6 on gestures and vocalization.

language acquisition (the *locutionary stage*). The child's communication dramatically increases in rate and becomes more consistent, explicit, readable, and sophisticated in form (Zeanah, 2000). The early single-word stage occurs between 12 and 18 months and is slow and still unstable. The child begins to connect between permanent vocalizations and their agreed upon meaning in the adults' language. At this stage, the majority of his/her communication signals still include a variety of gestures and vocalization. The child also can decontextualize (free from context) words and this ability is believed to reflect the increasing knowledge of situations and concepts (Barrett, as cited in Wetherby, Reichle, & Pierce, 1998). The acquisition of new words becomes associated with conceptual representations of objects and events (Wetherby et al., 1998). At 18 months, vocabulary dramatically increases. Two or more words are used by the child to express more complex meanings which were initially expressed through nonverbal behavior. Language still primarily refers to immediately observable events. In the second year, language comprehension is greater than its production. By 24 months, there is less need for contextual or environmental support and language comprehension is expanded greatly. In the third year of life, the child moves from semantic or meaning base to sentence grammar and fine-tuned meanings, can communicate about future and past events and emotional states, and finally becomes a conversational partner (Zeanah, 2000).

### **2.2.3 Interaction and communication development of children with hearing impairments (0-3 years of age)<sup>12</sup>**

This section will focus mostly on the interaction and communication that develops between hearing mothers and their children with hearing impairments (Hd, i.e. 'H' for hearing mother and 'd' for a child who is deaf) since these dyads are relevant to this study. As with hearing parents and their children with NH (normal hearing), most studies have collected data on the mothers-children interaction rather than fathers.

As previously mentioned, normal communicative development is dependent on the interaction between the caretaker and the child. A child's disability may affect this development. Shonkoff and Meisels (2000) summarize different studies on mother-child interaction in which the infant is disabled or at risk for disabilities. The results

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<sup>12</sup> The researcher will mostly relate to hearing parents and children who are hearing impaired since these are relevant to this study.

show differences in interaction compared to normal infants. Some evidence shows that mothers of children with disabilities dominate the interchanges and their infants are less involved in the interaction. Furthermore, over time, mothers and their disabled or premature infants are less successful at mutually adapting their behavior to each other than are dyads with non-disabled infants. The authors summarize that although more research is needed, one must consider the following tentative conclusions:

1. Individual parent and infant characteristics must be considered in assessment because of the variability in these infants' cues.
2. The development of reciprocity depends on the mutuality that develops between parent and child; therefore, the contingent nature of the interaction must be assessed.
3. Assessment procedures must measure adaptations and change at regular intervals because interactions change over time.

The literature about the interaction in Hd dyads (hearing mother and a child who is deaf) is controversial and differs in its conclusions. In this section, there will be an attempt to present some of the issues brought up on this topic.

Dromi and Ringwald-Frimerman (1996) describe the long, slow grief process, and the emotional coping mechanisms that parents employ in order to adjust to the discovery of the child's hearing loss. This holds true for siblings as well. These processes strongly affect the process of reciprocal relationship between the hearing parent and the child who is hearing impaired. The authors write that hearing impairment can cause disturbances in transmitting emotions between the hearing parent and the child who is hearing impaired since the child has difficulty perceiving the parent's emotional content from the parent's voice characteristics, and the hearing parent receives only partial information on the child's emotional state due to difficulties in vocal production. In addition, the authors refer to some studies indicating that babies who are hearing impaired show more neutral facial expressions than babies with NH during parent-child interactions. These findings raise the question of the emotional attunement during mutual social relationship. The assumption was that the baby who is hearing impaired is busy reading information from the hearing parent's face and thus, does not respond to emotion that is expressed in the face. In marked contrast to the hearing mother, the deaf mother provides the

baby with rich information that is expressed also in the movements of her hands and other body part and the baby learns to focus upon this information and to pay attention to it. Thus, a neutral face does not necessarily mean negative expression or a manifestation of lack of interest or lack of response.

Related to the issue of the child's focusing upon information is the visual attention which is important in developing joint reference, the process whereby child and adult share a focus of interest, generally child-led, about which communication takes place (Baldwin, 1991). Among hearing partners, the parent can talk about the child's focus of attention whether or not the child is looking at the parent, but for children who are deaf, the visual channel is crucial for acquiring information (Knoors, Meuleman, & Klatter-Folmer, 2003). Gallaway and Wool (1994) indicate that when hearing parents talk to their child who is deaf while looking at the referent rather than the child, fail to acknowledge the deaf child's difficulties with access to language input. Thus, the child misses opportunities for communication because he is maybe unaware to the fact that the parent is talking. Mutual gaze and facial expression also support the development of affect and secure the emotional relationships that form the basis of communication (Murray & Trevarthen, 1986).

Due to the hearing loss, the mother's communication attempts maybe unheard (Mashie, Moseley, Scott, & Lee, 2005). The child then responds in less than expected ways for the mother. This lack of reinforcement may start a cycle that limits or reduces the mother-child bond. Other relationships, including those with peers, can be affected as well by this dynamic. These fractured relationships have a strong impact on the child's development (including psychosocial development, self-esteem and pragmatic skills). Koester (1994) indicates that not only is the child's language development influenced by the problems in communication but also the coordination and timing of interactions.

Infants between the ages of three, five, and eight months, who are deaf, had more physical contact with their mothers with NH than infants with NH. The authors in this study suggest that mothers of infants who are deaf utilize more tactile means when interacting with their infant (Meadow, Erting, Bridges-Cline, & Prezioso, 1985). Spencer (1993) documented communication behaviors of two groups; each was composed of 18 dyads videotaped during mother-infant play with toys at 12 and 18 months. The mothers of the infants who were hearing impaired produced more gestural and tactile communications, but similar number of vocal communications. In

contrast with earlier reports, infants with and without hearing loss were similar in quantity of gestural and vocal expressive prelinguistic communication behaviors.

Brinich (1980), and Wedell-Monning and Lumley (1980) suggest that hearing mothers of children who are deaf tend to be more controlling and less child-centered than hearing mothers of children with NH (see also Jamieson, 1995). Scroggs (1983) found that in the interaction between infants who are hearing impaired and their hearing mothers, the mothers used a rhythmic behavior to get the child's attention. The rhythmic behaviors were used to direct the child to continue playing with a familiar game and check whether he/she is interested in a specific game, and also as an imitation game between the child and the mother. This behavior was usually presented itself with more than one modality. For example, the mother beat a cube, vocalized and moved her head simultaneously according to the rhythmic beats. The child did not hear the beats but perceived the other signs and a rhythmic interaction occurred.

Meadow-Orlans (1990) claim that hearing parents tend to over protect their children with HI more than their children with NH and to demand less from them during everyday life. This finding may mean that the social-emotional experience of children with HI is more limited than that of children with NH.

Spencer and Gutfreund (1990) analyzed dialogues between mothers with NH and their prelinguistic infants with HI and those of mothers and their infants with NH. Mothers of infants with HI contributed a greater percent of dyadic topic initiations than did other mothers. These mothers often tend to use imperative style of talking and ask questions in order to elicit response from the child while communicating with him/her. The literature shows that a mother's style of control in turn-taking and choice of conversational subjects is not positively related to child's language development.

Day and Prezioso (as cited in Dromi & Ringwald-Frimerman, 1996) interviewed hearing mothers of children with HI. The mothers expressed their feelings that they should be full-time teachers as well as providing their child with an unending linguistic model as a compensation for the hearing loss. Consequently, they do not enable the child to initiate and lead the conversation. Spencer and Gutfreund (1990) indicate three factors that can explain the phenomena of over-teaching: (a) The child's delay in language development impels the mother to lead and direct the child in order to maintain the continuity of the mutual relationship, (b) The fear of

communicative failure motivates the mother to think that she should take more control in order to continue the mutual relationship, and (c) The child's passive communication makes the mother feel that she should fill in the empty spaces in the mutual relationship. In addition, the authors claim that babies of directive and teaching mothers learn from their experience that their efforts to communicate are not important, and therefore they may develop passivity in communication.

On the contrary, research reviewed by Lederberg and Prezbindowski (2000) suggests that the impact of childhood deafness on the social relationship quality of the dyad Hd is not necessarily negative in the areas of attachment, quality of maternal affective behavior, and maternal control. The absence of differences in secure attachment found for hearing parents and young children who are deaf and hearing parents with children with NH substantiates this conclusion. The resiliency of the parents and an adequate support network can facilitate the parents' adjustment to the diagnosis and subsequent parent-child relationships (Meadow-Orlans & Steinberg, 1993). Greenberg (1980) found that among hearing mothers and their infants who are profoundly deaf, there are patterns of attachment that are similar to infants with NH. In a study of hearing mothers of young children with hearing loss, Pipp-Siegel, Sedey, and Yoshinaga-Itano (2002) found that if these mothers are given appropriate early intervention support, they do not exhibit comparatively more stress than their peers with hearing children. The authors note that this finding has potential implications for attachment, considering the association between insecure attachment and high levels of parental stress.

Hadadian's purpose (1995) was to broaden the knowledge base about attachment relationship of children who are deaf and their fathers, as well as with their mothers. Hadadian noted that as a group, there were no differences between security attachment scores of children who are deaf with either of their hearing parents but differences were revealed within individual dyads of mother-child/father-child relationship.

Nicholas and Geers (1997) compared the communicative behavior of 36 children by using video-recordings of mother-child interaction and coding it for modality and communicative function. The children were 36 months-old, 18 were deaf<sup>13</sup> and 18

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<sup>13</sup> The terms 'deaf' and 'hard of hearing' represent a continuum of hearing loss and describes how a child accesses communication. The term 'deaf' refers to those children whose primary access to communication is through vision (e.g., speechreading or sign language). The term 'hard of hearing'



had normal hearing. Results showed that children with NH used significantly more speech than children who are deaf did and that they used speech significantly more than the other modalities and for most communicative function types. Children who are deaf showed no significant difference in their use of the different modalities (verbal and non-verbal); they also had no uniform method of communication and no equal distribution of the use of the different modalities across the communicative types.

Lederberg and Prezbindowski (2000) summarize the research reviewed by them and suggest that a child's deafness does not have general impact on mother-child social interactions in a number of areas, including attachment, quality of maternal affective behavior, and maternal control. Many mothers are able to intuitively adapt to different affective needs of their children during early development. The authors' review suggests that negative interactions may be specific to certain samples and limited to subsets of Hd dyads. Although the studies reviewed had relatively large sample sizes (at least 20 subjects in each group under study), the authors advise using caution in making firm conclusions about the interaction because not enough research exists in this area.

During the early stage of lexical development, gestures provide all young children with an additional modality they can use in parallel to the emerging of lexicon. Eventually, the relationship between speech and gestures is reorganized and gestures become subordinate to that of speech (Wetherby et al., 1998).

In infants with NH, the first word usually emerges around 12 months, and by two years most children are putting two words together, while some are doing more than that. This process is dependent on a full year of attentive listening activities. Studies of children who are deaf in families with NH found that the first words generally emerge later than in typical development, sometimes even towards the second year of life. In addition, the progress in acquiring vocabulary thereafter is slower (Lederberg, 2003; Lederberg & Spencer, 2003). Much depends on individual circumstances, for example, the age when deafness was identified and severity of hearing loss. (Paul, 2000).

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refers to those children whose primary access to communication is through audition alone or audition and vision combined (Mashie et al., 2005).

Some children who are deaf in families with NH spontaneously generate ‘homesigns’, even when signing input is absent in their homes (Goldin-Meadow & Mylander, 1983). These children invent gestures and use them consistently as formal signs. As such, they can be interpreted by family members and serve a useful communicative function when spoken communication is severely limited. However, these ‘homesigns’ do not lead to the development of a full sign language unless sign language input is provided from an early age. Marschark and Spencer (2003) indicate that unfortunately, early prelinguistic communication abilities frequently do not serve as a foundation for the transition into language for children with deafness who grow up in families with NH.

Later on, lexical development among children who are deaf in families with NH continues to progress more slowly. Their vocabulary is acquired through direct communication, rather than incidentally through overhearing others (Herman, 2004a).

Regarding children with cochlear implants, in a study of prelinguistic communication of 18 children with cochlear implants who were implanted at an average age of 15 months, it was found that if children lack an appropriate prelinguistic behavioral repertoire, the emergence of age-appropriate formal language may be at risk. The authors suggest that symbolic prelinguistic behaviors are necessary, but not sufficient, for the development of strong linguistic skills (Kane, Schopmeyer, Mellon, Wang, & Niparko, 2004). Tait, Lutaman, and Robinson (2000) found that frequency of prelinguistic communicative contributions during pre-implant interactions, regardless of modality, related to the children’s post-implant speech perception and production outcomes. Marschark (1993) assumes that factors such as child temperament, participation in reciprocal early interactions, and perhaps parental skills influence the way that has been documented for other children who are deaf.

More literature on communication of children with HI is presented in sections 2.2.4 as well as on sections 2.2.5 and 2.2.6, on babbling and gestures.

#### **2.2.4 The communicative interactions in this study**

This study focused on four communicative interactions which are important features of prelinguistic communication: Imitation, initiation, turn-taking and synchronization (see definitions on section 3.6). These interactions are mechanisms of communication that result in communicative modalities such as vocalizations (from involuntary, reflexive sounds to babbling and words), various gestures (manual, facial, or the

entire body), and ultimately, the emergence of words.

This study also focused on the spontaneity of the above mentioned communicative interactions. Klinger and Dawson (1992) refer to the importance of spontaneity in their child-directed strategies for facilitation of early social and communicative development. The strategies were developed to increase the *spontaneous* use of skills that are necessary for social interaction and communication. Their approach places the child in the role of initiator, and capitalizes on naturally occurring patterns of social interaction. Reichle, Halle, and Johnston (1993) write about the role of spontaneity in initiating, maintaining and terminating conversations. They distinguish between initiation and spontaneity and explain that a child's initiative act can be carried out after being prompted by an adult rather than spontaneously, thus being less valued in terms of the child's communicative development. They stress that it is more important for interventionists to consider spontaneity as a crucial factor in facilitating communication, especially in the case of persons with developmental disabilities.

The sections below will refer to these four communicative interactions first in general, then specifically for children with HI, and finally, to the way they are used in music therapy. These sections will be followed by a description of the communicative modalities mentioned previously, i.e., gestures and babbling, in general and again, specifically for children with HI. Although babbling and gestures have been previously mentioned (see section 2.2 & sections 2.2.2~ 2.2.3) they will be reviewed here in greater depth due to the relevance of their frequent use by the children in this study. Lastly, research as well as anecdotal literature on the effect of music therapy on these spontaneous communicative interactions will be presented in section 2.2.9 (Music as a facilitator of communication).

#### **2.2.4.1 Imitation**

Wyrwicka (1996) writes that imitation "can roughly be described as the copying by an individual of a certain motor or vocal act performed by another individual (usually for the same species)" (p. 1). Alvin (1966) notes that imitation and repetition are two processes through which man learns, develops and creates.

Meltzoff and Moore (1977) showed that imitation<sup>14</sup> in neonates can occur even in 12 to 21-day-old infants. Those infants were able to imitate facial expressions of an adult, such as mouth opening, tongue protrusion and lip protrusion as well as imitate manual gestures such as hand closing and opening when these gestures were performed in front of them by an adult. Other investigations also reported cases of imitation in infancy. Klinger and Dawson (1992) state that during the first six months of life, there are frequent communicative interactions between caregivers and their infants by directly imitating the infants' body movements, facial expressions and vocalizations. This early imitative play is a social exchange, which is evident in the infant's tendency to respond to the parent's imitations with visual interest and smiles. Meltzoff and Moore (1977) emphasize the infant's experience of being imitated. They write that this experience has special significance for infants, not only because of the temporal contingencies in the mutual behavior, but because infants recognize the adult's acts as structurally similar to their own.

Kugiumutzakis (1993) states that during the child's early months, the most basic function of vocal imitation in mother-infant interaction (and the first to appear) is an interpersonal sense of communicative sharing. These early experiences are likely to play an important role in the infant's growing awareness that he/she has participated in a social exchange and that others have mental states that are knowable (Stern, 2000).

From the classic studies on imitative behavior of young children up to three years of age, most of the experimental data were of Piaget (1962). He postulated that the ability to imitate develops together with the individual experience acquired by the child with age. He found six stages in the development of imitative behavior, from the first stage of a reflex behavior caused by an external stimulus, to finally deferred imitation. The latter occurs when the imitation does not occur immediately after an action is demonstrated by a person but some time later and not necessarily in the presence of that person, which means that "the child becomes capable of imitating internally a series of models in the form of images or suggestions of actions" (p. 62). This capability (related to new objects) already exists in infants at below one year of age.

The gestural or verbal child's imitative act represents an early symbol, a single

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<sup>14</sup> The following sections on the four target behaviors will focus only on these behaviors in relation to young children up to three years old, the children's age in this study.

behavior that stands for the child's complete mental representation of an object (Bates, Thal, Whitesell, Fenson, & Oaks, 1989).

Wyrwicka (1996) indicates that undoubtedly, the imitation of others plays a critical role in the development of walking, eating, speaking, and other functions during the early stages of the child's life, by facilitating the acquisition of knowledge about the environment and behavioral adjustment to it. Knowing the environment is acquired through non-imitative exploration of different objects, but knowledge about what to do with a given conventional object is acquired by a learning strategy through watching and imitating what others do with it.

Nadel and Peze (1993) raise the question whether imitation is a specific or a mediating prerequisite for primary communication. They write:

To examine this point, the specificities of immediate imitation, as compared to other cognitive prerequisites, need to be taken into account. The first of these is that imitation is by definition a social behavior requiring a partner to refer to. Second, it is strong elicitor of emotional sharing, a precocious interactive basis (Trevarthen, this volume). Further, immediate imitation serves two fundamental epigenetic closely intermeshed functions: learning and communicating (Uzgiris, 1981). Thus, overall, there are several compelling arguments to view imitation as a *primum movens* of primary communication (p. 152).

Dromi and Ringwald-Frimerman (1996) write that in order to be capable to imitate, the baby needs first to perceive the model presented to him/her, then to activate the motoric feedback and to produce that model. The ability to imitate requires coordination between perception and action (see also Prinz, 2002, p. 160), and it is an evidence of the ability to recall that action.

Dromi and Ringwald-Frimerman (1996) differentiate between different types of imitation (spontaneous and elicited), different levels of similarity between the model to the imitative act (exact, reduced, and expanded imitation), and different temporal characteristics of imitation (immediate and deferred imitation). It is possible to identify stages in the development of imitation in infants. First, immediate imitation occurs, there is a great similarity between the model to the imitative act and the imitation occurs when the model is present in front of the infant. Young babies usually imitate actions or sounds that have immediate auditory visual feedback. At

about one year of age, the baby is capable to expand the imitative ability beyond the immediate model, and there is also a transformation among the different senses. Deferred imitation emerges that is an evidence of the ability to retain and recall a model which does not exist any more.

Klinger and Dawson (1992) summarize the social functions of parental imitation (see p. 166 for reviews):

- Increased attentiveness toward social interaction;
- Facilitation of early turn-taking behavior;
- Development of a sense of self as related to others;
- Enhancement of infant imitation of others;
- Shaping of emotional expression and awareness.

They add that imitating an infant also serves to reduce the amount of stimulation experienced by the infant by placing the infant in the role of initiator.

Yoder and Warren (1993) state that one of the simplest prelinguistic strategies is the adult's contingent imitation of the child's behavior since-

- It allows the child to regulate the received amount of social stimulation.
- It increases the probability that adult input will be easily processed and understood (Dawson & Lewy, as cited in Yoder & Warren, 1993).
- It may encourage the child to imitate adult behavior (Snow, 1989).

The authors emphasize that vocal imitation is an important goal of prelinguistic communication interventions because it is assumed to be related with speech. There is a consensus in the literature that children learn the conventional communication behaviors specific to their culture through imitation (see also Snow, 1989). They add that "a final modification of the milieu teaching model for prelinguistic children is the addition for contingent imitation as a means for initially building routines and encouraging vocal imitation. Contingent imitation is used in response to a child's vocal or non-vocal behavior. In either case, the adult exactly imitates or slightly modifies the behavior exhibited by the child immediately after it occurs" (p. 48).

Little research has been done on spontaneous imitation in an adult-child interaction (Masur & Rodmaker, 1999). In addition, minimal research has been found by the researcher on imitation and children with HI. Best and Roberts (1976) found

that 16 children who are hearing impaired, in the ages 23-38 months, progressed normally through the period of sensorimotor development, except in the area of vocal imitation. Dromi and Ringwald-Frimerman (1996) refer to motoric and vocal imitation as the two central components in language intervention with children who are hearing impaired. In spite of Best and Roberts's finding, they suggest taking this area into consideration since motoric and vocal imitation is central in establishing the different communicative modalities in language acquisition.

Wyrwicka (1996) points out that factors antagonistic to the particular imitative case can inhibit imitative behavior. Such factors include knowledge acquired by education, or personal experience about the negative consequences of particular imitative acts.

Bruscia (1987) and Wigram (2004) refer to imitating as a technique<sup>15</sup> of empathy in improvisational music therapy, where the therapist can convey empathy directly to the client with a message that he/she is meeting him/her at their level and confirming what he/she is doing. Bruscia (1987) defines imitating as "echoing or reproducing a client's response after the response has been completed" (p. 535). It can be done by using rhythm, interval, melody, body movement, verbalization, etc. offered by the client. Bruscia suggests using imitating selectively and carefully, i.e., only with certain client's responses and in a way that does not convey mimicry. He details the purposes of imitating as follows:

Imitating is used to focus the client's attention on his/her actions, to reinforce the client for reacting or communicating, to indicate to the client which aspects of his/her responses are relevant to the task or situation, to convey acceptance of the client's offering, to verify the client's intended message, to establish turn-taking as an interactional paradigm, to give the client an opportunity to lead and have control over the therapist, and to model imitative behavior (p. 538).

When a therapist is working with more than one client, he/she may suggest what Bruscia calls "peer imitating", i.e., when one client imitates another. Verbal imitating may also be used by the therapist by repeating verbatim what the client says, with the

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<sup>15</sup> According to Bruscia (1987), a technique is defined as "an operation or interaction initiated by the therapist to elicit an immediate response from the client, or to shape his/her immediate experience" (p. 533).

same or different tonal inflection. It can be used to reinforce something that has been said by the client, to clarify it or to induce self awareness. When referring to synchronization (see section 2.2.4.4), Bruscia mentions also '*canonic imitation*', which occurs "when the therapist is one or more beats behind the client in reproducing what the client does" (p. 538).

Wigram et al. (2002) write about imitation as a response-evoking technique. They claim that imitating a child's action, often results in a positive response from the child. The music therapist can imitate the child's musical initiatives as well as the way the child is playing. Wigram (2004) adds that imitation or copying relies on the client leaving spaces in the music for the therapist to imitate what he/she is doing. The carefulness it should be used with is to avoid the client's feelings of being teased or patronized by the therapist.

#### **2.2.4.2 Initiation**

McTear (1985) describes the development of children's initiating strategies and raises the question of when children begin to use gestures and vocalizations as a means of eliciting responses. Mctear states that we can find fairly clear intentional initiations from about nine months, while Mashie et al. (2005) indicate that a child with NH, as well as a child who is hearing impaired, starts to intentionally communicate through the use of gestures already at around six months of age (see also section 2.2.6). These gestures indicate the process young children go through when they learn they can influence their environment but do not have yet a structured means such as oral or signed language (Mashie et al., 2005). McTear (1985) asks about the cries and gestures of children who are younger than nine months and cite Foster, who found that the earliest strategic initiations (i.e., those in which it might be possible to attribute some communicative intention to the child) in the ages of one month to five months involved self-topics, where the child tries to attract the caretaker's attention with something like a cry. The caretaker's task is to find the appropriate response. Later on, the ability to direct attention to objects in the immediate environment (i.e., environmental topics) develops, followed by reaching behaviors at age of five months, but clearer examples are seen with pointing behaviors at fifteen months, and later still, through the use of attention-directing words.

Caretakers often treat children's behaviors as if they were communicative and so establish them as initiations to which they provide an appropriate response. The



problem is to determine when one can attribute to the child the intention to communicate and to elicit a predictable response (McTear, 1985) (see also section 2.2.2).

Reichle, Halle, and Johnston (1993) write that the terms initiation and spontaneity are used interchangeably in the literature, whereas one should distinguish between them, since a child can initiate an act while being prompted by an adult rather than spontaneously (see also section 2.2.4 on the role of spontaneity). The development of spontaneity is a crucial factor in facilitating communication, especially in the case of persons with developmental disabilities.

According to Reichle et al. (1993), initiation is one of three broad classes of behavior that may occur in the context of social exchanges: initiation, maintaining and terminating. Initiation, as maintaining and terminating, can be expressed in one of three communicative functions- request, reject, and comment (see Table 2, p. 116 in Reichle et al.). Stern (2000) indicates also that the most straightforward and common examples of intentional communication are protolinguistic forms of requesting (p. 131). For example, the infant wants a cookie which the mother holds in her hand. He/she reaches out a hand, palm up towards the mother while making grasping movements and looking back and forth-between the hand and the mother's face, shouting "Eh! Eh!". This implies that the infant attributes an internal mental state to that referent person, namely, comprehension of the infant's intention and the capacity to intend to satisfy that intention.

Regarding social initiations of preschool children without disabilities, Goldstein and Kaczmarek (1992, see p. 84 for reviews) summarize that they tend to contribute equal number of utterances in an interaction among themselves. Their tendency to balance their contributions is viewed as evidence that preschool children are able to adapt the frequency of communication to that of their partners.

The research on initiation focuses mostly on initiating social interactions of children with developmental disabilities due to its importance for various issues such as integration of these children in educational settings, and the development of social interactions in the community. For example, Spencer, Koester, and Meadow-Orlans (1993) examined initiations of communicative interactions between children who are deaf and children with NH, ages 28 to 36 months, in a day care program designed to promote successful integration of these children. Each of the participating groups showed a stronger tendency to initiate communication with same hearing status peers.

There was also relatively low number of initiations of the children who were deaf. The authors found that even among young children, language ability rather than hearing status was associated with the frequency of communications that children experienced. Weisel, Most, and Efron (2005) note that a partial explanation for the low number of initiations might be the adults' strong tendency to control and dominate the children's initiation and maintenance of social interactions (Spencer & Gutfreund, 1990; Weisel & Zandberg, 2002). Weisel et al. (2005) write that research on young children's communication has focused mainly on aspects such as vocabulary and syntax in the process of language development. However, research on the pragmatic aspects of communication and the social interactions of young children with HI is limited. Their study examined initiation of interactions of young children with HI, aged 2–3 years, with peers with NH compared to their initiation of interactions with children with HI. The authors conclude that preschool educational programs that integrate children who are deaf together with their hearing peers should be aware of the social difficulties that already occur at a very young age. They relate to the fact that previous research reported the efficacy of intervention programs in the area of social skills with deaf and hearing children of various age groups. Their recommendation is to incorporate early intervention programs in the area of social interaction, including initiation strategies, at a very young age.

There are also differences between the strategies used to initiate interactions. Duncan (1999) examined the social discourse/conversational skills of children ages 3.6–5.9 with HI and those with NH in an integrated setting. Results showed that the children with HI used more physical initiations strategies (i.e., touch) than did their peers with NH in integrated kindergartens.

In music therapy, Oldfield (1995) writes on her approach as a music therapist while trying to balance between following and initiating during the sessions. She indicates that “the actions of following and initiating are so closely intertwined that in many instances it is impossible to say who is the leader and who is the follower” (p. 226). Oldfield also refers to directive and nondirective approaches for achieving therapeutic objectives within a music therapy session. The questions she raises concerning this issue are whether the therapist suggests activities or waits for the child to initiate them, whether the therapist steers the musical improvisation in a particular direction or simply mirrors what the child has initiated, and whether the therapist leads the session or being led by the child who is the initiator. In her work

with children who have autistic spectrum disorders, Oldfield is extremely directive for the first and the last two minutes and much less so for the rest of the session, since she thinks it's crucial for these children who may be confused and isolated, to be reassured by a framework surrounding an event.

Therapists in general and music therapists specifically deal constantly with the issue of balancing between following and initiating in their clinical work. This issue is intensified in working with severely delayed, disordered or absent language development, where the client's initiation is crucial for communication development (e.g., Holck, 2002; Oldfield, 2006; Warwick & Muller, 1993). Another example is of Scheiby (2002), who describes her purposes in music therapy with clients with neurological trauma. Taking different initiatives by the clients is a major goal for them. As Holck (2002) writes: "For communicative development to take place, a child must have the desire, ability and possibility to influence the environment and be influenced by it. In this area of communication, music therapy particularly has the potential to help..."(p. 183).

#### **2.2.4.3 Turn-taking**

Researchers have found that from the first weeks of life, patterns of parent-baby interaction resemble proto-dialogue. Observations showed that each partner takes a turn: when the baby is vocally or bodily active, the parent observes; then the roles are reversed. The parent reciprocates by matching a facial expression or making a comment, which attributes meaning to the baby's actions (Kugiumutzakis, 1993; Mashie et al., 2005). Turn-taking is the fundamental temporal structure of a dialogue, and switching pauses indicate the boundaries of the turn exchanges (Jaffe, Beebe, Feldstein, Crown, & Jasnow, 2001). In the Jaffe-Feldstein model (Jaffe et al, 2001) of vocal rhythm as a dyadic system, they describe five rhythms of dialogue within an interaction, starting with the turn rhythm, through vocalization-pause cycle, switching pause, co-action and exchanging turns. Yoshinaga-Itano's (1998) speech goals for the first year of life begin with the infant's awareness that parent-child dialogues involve vocal turn-taking. It may be an unintentional vocal sound, a sigh, a laugh, or a cough that becomes a vocal turn. A child learns turn-taking when the parent (or other partner) assumes intention on the part of the child, even when it is not there. The child quickly learns that when he/she vocalizes, a desired response- attention from the parent and a vocal response - occurs. The parent, after producing a vocalization,

should pause long enough for the child to take a vocal or non-vocal turn in order to facilitate the turn-taking.

When language starts to develop, turn-taking is not limited to conversation but also becomes an inseparable mechanism of social life and “allows for the orderly distribution of moves when people are engaged in social acts” (Gelber, 2002, p. 2).

Duncan (as cited in Gelber, 2002) states as follows: “Just as it is desirable to avoid bumping into people on the street, it is desirable to avoid in conversations an inordinate amount of simultaneous talking. Beyond considerations of etiquette, it is difficult to maintain adequate mutual comprehensibility, when participants in a conversation are talking at the same time” (p. 283). This communicative mechanism, as Duncan calls it, allows for smooth and appropriate exchange of speaking turns. These speaking turns represent turn-taking. Jaffe (1978) indicates that turn-taking developed as a biological solution to the human being’s limited cognitive capacity for verbal information processing. Holck (2004) points out that the ability to alternate between initiator and imitator does not fully develop until the age of 30 months in normal development.

Other authors cited in Gelber (2002, pp. 4-8), noted the importance of turn-taking in conversation. For example, Goffman (as cited in Gelber 2002) gives a set of rules that are followed by interlocutors. Regarding these rules, terminating an interchange is also rule bound. Several exchanges may occur before termination can be accomplished. It cannot end until everyone involved in the interaction is satisfied. On the other hand, the termination can be hindered by a situation where each participant is so polite that he/she wishes to defer to another participant/s before he/she takes turn.

Nadel (2002) concludes that primary conventional rules monitor and control imitative social exchanges and regulate turn-taking and role-switching. When children use imitation in their social exchanges, they can take turns, switch roles, share topics, and apply conventional rules; thus, they can communicate.

In an analysis of turn-taking within the social play of children who are three, four, and five year olds, Garvey (1974) found that turns fall into two major categories- saying or doing the same thing and doing or saying a complementary thing. Older children displayed more complementary utterances and younger children tend to repeat their partner’s utterances or actions.

In a dyad of child with NH and a hearing parent, the child learns to respond differentially to the tone of voice used. Intonation cues are especially important in signaling the end of the turns. In contrast, the child who is deaf is more responsive to the parent's visual appearance and touch. One result of the mismatch between a child who is deaf and a hearing parent is an increase in vocal clashes, that is, one partner vocalizes concurrently with the other. These clashes are extremely rare in interactions between hearing parents and infants with NH. In a study of deaf and hearing babies and their mothers, Gregory (1984) indicated that vocal clashes occurred only 1% of the time between hearing mothers and babies with NH, but 10% of the time between hearing mothers and babies who are deaf. This is indicative of difficulties establishing turn-taking which forms the basis for subsequent communicative interaction (see also Tucker, Hostler, & Nolan, 1984).

A hearing mother may not fully appreciate that her infant who is deaf responds to seeing her face rather than hearing her voice. Gregory and Mogford (1981) suggest that it is more difficult for mothers with NH to establish turn-taking and joint reference with their babies who are deaf because they expect to use sound to do it. Some studies (for review see Swisher, 2000) have concluded that deaf mothers do not have difficulty in the area, suggesting it is not the child's deafness, which is the issue. Mahshie et al. (2005) indicate that turn-taking activities may be limited or changed with the child who is deaf, and he/she may not learn the importance of the ability to take turns in a communicative interaction.

In their suggested strategies for facilitating social interaction, Klinger and Dawson (1992) describe the level one strategies of facilitating attention to people, social contingency and turn-taking. They write that the adult may incorporate turn-taking and anticipatory behavior in the imitative play. In order to facilitate this kind of interaction, he/she pauses before imitating the child rather than imitating the child simultaneously. This naturally leads the child to anticipate the adult's actions and creates a turn-taking type of interaction. When the child realizes that he/she is being imitated, a game is frequently developed in which the child switches the type or speed of activities in order to see if the adult follows. This is often accompanied by an affective response of laughter and looking at the adult's face.

Holck (2002) refers to turn-taking in music therapy. She indicates that it usually consists of imitation and variation through the use of vocal and instrumental sounds. Holck notes that in the beginning there are fixed roles, but later, the child and the

therapist exchange roles and take turns between the initiator and the imitator. Therefore, she prefers to use the term ‘turn-interplay’, since ‘turn-taking’ emphasizes the role of the person who takes the turn, while ‘turn-interplay’ stresses mutuality<sup>16</sup> (Holck, 2004). Wigram (2004) claims that "music is a marvelous medium for engaging in different types of conversation or dialogue between two or more people" (p. 97). Wigram defines 'turn-taking dialogues' and 'continuous 'free-floating' dialogues'. A turn-taking dialogue is defined as “making music together where the therapist or client(s) in a variety of ways, musical or gestural, can cue each other to take turns. This ‘turn-taking’ style of dialogue requires one or other to pause in their playing and give space to each other” (p. 98). The second type of dialogue means playing more or less continuously and simultaneously.

Nordoff and Robbins (1977) suggest presenting the child with a four measure phrase, leaving a rest at the end of each measure for the child to fill, in order to establish turn-taking. Bruscia (1987) points to two therapeutic techniques to enhance turn-taking: (1) “Interjecting- Waiting for a space in the client’s music and filling up the gap” (2) “Making space- leaving space within one’s own improvising for the client to interject his/her own materials” (p. 535).

According to Holck (2004), for initiating, maintaining and developing a turn-taking dialogue, there are a number of non-verbal cues (eye-contact, head nodding, facial expression and prosody). Wigram (2004) describes in detail gestural and musical cues that may promote dialogues. Among the musical ones are rhythmic, dynamic and timbre cues that can indicate a space for developing a dialogue, e.g.,: “Accents help to establish a punctuation point; making a crescendo on a phrase to a climax indicates a point of stopping; making an *accelerando* to a point of stopping also indicates a pause which allows a space for somebody to say something...” (p. 100).

#### **2.2.4.4 Synchronization**

In this study, one of the target behaviors was synchronization, which is actually termed ‘synchrony’ in the literature and as a construct, has been measured in many different ways. Although all definitions involve some notion of behavior adjustment

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<sup>16</sup> For further elaboration on turn-organization in an early mother-infant interaction, adult conversation and with children with communicative disorders, see Holck, 2004.

or entrainment to another, they can be classified into three broad categories (Bernieri, Reznick, & Rosenthal, 1988, pp. 243-244):

1. Biological rhythms, meaning that human behavior is understood to occur rhythmically and can be described in terms of cycles, periods, frequencies, and amplitudes. According to one approach in this direction, behavioral synchrony is defined as the degree of congruence between the behavioral cycles of two or more people. Much of the developmental literature involving adult-infant synchrony is of this type (see p. 244 for reviews).
2. Simultaneous behavior, meaning that synchrony occurs when one person directly imitates or mirrors another person's movements or body configuration. A broader definition includes simultaneous affect and attitudes as well as simultaneous movement changes.
3. Perceived synchrony, meaning that the apparent unification of two behavioral elements into a meaningfully described synchronous event, creates a whole, perceptual unit.

Fogel (1993) presented the term *interactional synchrony* which has various definitions and usages. According to some authors cited by Fogel (see p. 13), this term refers to an exact and precise temporal simultaneity of the beginnings and endings of actions between partners. During mother-infant interaction, the mother can often predict where the infant will look next, according to her previous communicative interactions with the infant as well as behavioral cues. Based on this anticipation, she can synchronize her behavior with that of the infant's by either naming the object to which the infant looks, talking about it or gesturing toward it. Frame-by-frame video analysis showed that there is an average lag of about 0.05 seconds between the mother's and the infant's behavior meaning that their actions are not precisely simultaneous. Fogel states that defining interactional synchrony as anticipation suggests explanation of socially co-ordinated activity that is based on a cognitive process of anticipation inherent in one or the other individual. This makes interactional synchrony a unilateral action and not a process of mutuality or co-regulation<sup>17</sup> as Fogel thinks it should be. To Fogel's view, a crucial defining aspect of interactional synchrony is the fact that actions are in the continuous process of

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<sup>17</sup> "Co-regulation is a social process by which individuals dynamically alter their actions with respect to the ongoing and anticipated actions of their partners" (Fogel, 1993, p. 12).

creation vis-à-vis the partner, i.e., synchrony is by definition, mutually dependent on both interactants within an interaction; it is dyadic in nature although parent-child interactions maybe guided largely by parents (see also Bernieri et al., 1988; Criss, Shaw, & Ingoldsby, 2003). Tronick, Heidelise, and Brazelton (1977) refer to the smooth synchronous flow of the mother-infant correlations and conclude that the infants are able to communicate intent and to respond to the intent expressed by the mother. They also note that although synchrony may be a way for a child to communicate *continue*, dissynchrony may communicate *stop*. Criss et al. (2003) write that synchrony has been defined in the literature as the degree to which the parent-child dyad displays responsiveness, reciprocity, engagement, mutual focus, and shared affect during interactions. Beebe (1982), Papousek (1996), Stern (1977) and Trevarthen (1993), all refer to synchrony as the matching of micro-level affective behavior between parent and child, which has long been suggested as an important mechanism underlying socio-affective development. Feldman and Grinbaum (1997) showed that mother-infant synchrony predicted symbolic play at two years of age above and beyond global assessments of the relationship in terms of sensitivity or responsiveness. Synchrony relates to the development of self-regulation, attachment security, and empathy (Jaffe et al., 2001). Tarabulsky, Tessier, and Kappas (1996) assume that the experience of synchrony may integrate biological rhythms into the rhythms of social dialogues.

Asendorpf (2002) relates to the relation between early imitation and self awareness and states that during the second year of life children become increasingly able to communicate with other peers through *synchronic imitation*. They play simultaneously with the same type of objects in a similar, though not always identical, way. They regularly and continuously look at their partner (looking at the partner's objects is not sufficient), and seem to realize and enjoy the reciprocity inherent in their joint play. They often begin and end the object use at the same time or shift to a different activity almost synchronically. This synchronic imitation quickly becomes the most important preverbal form of communication among peers. Synchronic communication is different from ritualized forms of dyadic play such as peek-a-boo that appear much earlier in infant-adult communication. The latter requires only the acquisition of simple stimulus-response rules, such as turn alternation. What appears to emerge the second year is the more advanced ability to coordinate one's behavior with the non-ritualized behavior of an adult or a peer. According to Asendorpf, the



capacity for synchronic imitation requires several specific abilities that develop earlier:

1. Children must be able to look where adults are looking (joint attention). First forms of joint attention emerge around nine months of age.
2. Children must be able to imitate the unfamiliar activity of a stranger (between nine to fourteen months of age).
3. Children must be able to recognize the contingency between their own behavior and that of their partner.
4. Children can distinguish between accidental and intentional actions by others. (between fourteen to eighteen months of age). Asendorpf emphasizes that the “Thou feeling”<sup>18</sup> during synchronic communication, which is based on an understanding that I share the intentions of my interaction partner, may be more difficult than merely recognizing that others have intentions of their own.

Bernieri et al. (1988) write that synchrony can serve many possible functions, e.g., infants synchronize to adult speech but do not synchronize with non-speech-related sounds such as tapping, street noise, and white noise. An absence of synchrony has also been observed in people who have dyslexia and other learning disabilities, meaning that synchrony may be an essential precursor to language development. A state of high synchrony may note existing states or motivation for sociability among the interactants. In addition, it might even serve a communicative function in and of itself, signifying interest or approval (see reviews on p. 252). The authors add that synchrony for young children may be a means by which they regulate their involvement in social interactions. In a series of studies by Mize and Pettit (as cited in Criss, Shaw, & Ingoldsby, 2003), mother–child synchrony was observed in a laboratory setting, using a sample of families with preschool-age children. The findings indicated that synchrony was related significantly to lower levels of child aggression and higher levels of child social skills and peer acceptance.

There has been ongoing research on the interaction between a hearing parent and a child with HI (see section 2.2.3) but only minimal research which related specifically to synchrony in Hd dyad, was found by the researcher. Tucker, Hostler,

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<sup>18</sup> The feeling of “Thou”: “The intuitive understanding that I share common intentions or plans for actions with my interaction partner “ (Buber, as cited in Asendorpf, 2002, p.64).

and Nolan (1984) write that there are more vocal clashes in Hd dyads than in Hh dyads (mothers with normal hearing and children with normal hearing). They note that vocal clashes are a measure of interactional synchrony, meaning that synchrony is problematic in such dyads.

In music therapy, Bruscia (1987) defines the technique of mirroring as synchronizing- “doing what the client is doing at the same time” (p. 535). He describes synchronizing as one of the empathic techniques used in improvisational music therapy to support, stabilize, or strengthen the client’s response, to promote self awareness, to create more intimacy in the client-therapist relationship, to offer leadership opportunities, and to convey acceptance and identification. He states that synchronizing can be accomplished on various levels of precision, from trying to match many aspects of the client’s response to matching only certain dimensions. Bruscia notes that the therapist may stay within the same modality of expression (unimodal) or transfer to another (crossmodal). *Unimodal synchrony* occurs “when the therapist matches the rhythms, melodies, and/or lyrics of the client and stays in unison with the client as they are being produced” (p. 538). It can also be implemented in other modalities such as movement, mime and play. In *crossmodal synchrony*, “the therapist temporarily matches the client’s action in a different modality, or perform a completely different act in temporal unison” (p. 539). According to Bruscia, synchronizing involves imitating the client’s actions simultaneously rather than successively. He emphasizes that although this technique calls for going beyond the client's observable acts, it does not necessarily involve reflecting the client's feelings or matching the client's energy level.

Wigram (2004) uses the term ‘matching’ for synchronizing. He gives an inclusive definition of matching as follows:

Improvising music that is compatible, matches or fits in with the client’s style of playing while maintaining the same tempo, dynamics, texture, quality and complexity of other musical elements. To achieve a ‘match’ in musical terms means that the therapist’s music is not identical to the client’s but is the same in style and quality. Therefore the client experiences that the therapist’s music ‘fits together and matches’ his or her own production. (p. 84).

Wigram regards matching as an empathic method which confirms and validates

the clients' playing and their emotional expression. To his view, matching is one of the most valuable of all the improvisational methods that can be applied in therapy, from which other therapeutic strategies or methods emerge.

In paraverbal therapy developed by Heimlich (as cited in Bruscia, 1987), the music therapist uses music to accompany, reflect, stimulate and guide the client's experiences. In addition, synchronizing is used as a basic technique that can be implemented by the therapist through either movement or music and is especially useful in the regressive, nurturing experiences. Boxill (1985) indicates synchronization in addition to mirroring, and imitation, as a technique used to reflect the client moods and feelings. Simpkins (as cited in Bruscia, 1987) uses synchrony during the "attend" phase in his model of "integrative improvisation therapy", when the client may or may not offer a purposeful response or expression and then, different procedures and techniques are necessary to engage him/her.

### **2.2.5 Vocalization and babbling**

The primary expression of deep instinctual feelings is vocal: cries, wails, moans, chuckles, sobs and yells, etc. For the first three months, the preverbal infant uses the voice to express instinctual feelings such as yearning for nourishment and distress. Its melody rises and falls like a siren. Trevarthen (1979, 1987) indicates that vocalizations of newborns have remarkable features that could be related to the basic foundation of speech. Within weeks, the mother is able to distinguish her child's cry from that of many others without face-to-face contact due to her innate ability to detect the idiosyncratic baby's voice with its special rhythm and melody. In addition to these tonal cries, the baby also makes what are called vegetative sounds, or reflexive vocalizations such as coughs, hiccups, lip smacking, burps, and wheezes, which result from physiological processes (Dromi, 2001; Loewy, 1995; Newham, 1994). At around three months old, a new quality of cry emerges- the first so-called pleasure cry. The mother then learns to differentiate between different cries. She has the capacity to perceive in the infant's melodic arrangement of pitch a language, which is as sophisticated as the baby's needs (Newham, 1994). According to Hsu and Fogel (2001), studies that rest on a stimulus-response model of communication claim that within a dyadic communication system, adult responsiveness (e.g., looking, smiling, touching, and verbalizing) is thought to be the main factor in eliciting infant's vocal responses. However, the authors prefer an alternative model that is a

dynamic process characterized by continuously coordinated and mutually regulated actions by both partners (see p. 89 for reviews).

Towards the end of the first year, the hearing baby's vocalizations change considerably from the involuntary, reflexive sounds produced shortly after birth to non-reflexive vocalizations (e.g., cooing, playful productions and yelling). The baby then engages in more vocal play until about 30 weeks of age (Dromi, 2001; Stoel-Gammon, 1998). Then, the hearing infants start to repeat a single syllable over and over again. They can do this replicated babbling (such as 'dadadada' or 'mamama') any time between seven and ten months of age. Babbling is defined as "reduplicated sequences of consonants (C) and vowels (V) (Schauwers, Govaerts, & Gillis, 2002, pp. 25-26). Some authors define it as 'babble' if it consists of a consonant and a vowel. The repetition of CV sequences give rise to the labels 'repetitive babbling', or 'canonical babbling'" (Schauwers et al., 2002, pp. 25-26). Dromi (2001) indicates that during the extremely important canonical babbling stage, two types of production emerge:

1. Reduplicated babbling: Identical repetitive sequences of CV syllables (e.g., 'ma/ma, da/da);
2. Variegated babbling: Sequences of different consonants and vowels (e.g., CV, V, VC, VCV= /ga/e/im/ada).

Stoel-Gammon (1998) claim that although canonical syllables represent a key stage in vocal development, they do not represent the most frequently occurring type of vocalization.

Parents imitate their babies by babbling back to them or reshaping babble sequences into words. This serves as a motivator for the baby to continue, as well as allowing the baby to match his/her own sounds with those produced by the parent. As a result, the baby modifies and increasingly refines subsequent sound production (Herman, 2004b).

Regardless of the language spoken at home, studies of parents have shown that adults are particularly responsive to babies and make similar changes to their speech patterns when addressing the babies. These include using a higher overall pitch, more varied intonation, a slower tempo and a singsong rhythm (Muir & Slater, 2000). These changes, referred to as 'baby talk', 'motherese' or 'infant directed speech' make speech sound more interesting to the baby and serve as a signal to the child to attend.

In addition, the early ‘conversations’ between parents and babies have highly repetitive nature. This repetition is extremely helpful to the baby who will soon be trying to make sense of what is said (Herman, 2004b). Papoušek, Paoušek, and Bornstein (1985) add that besides many repetitions, motherese is characterized by shorter utterances, and longer pauses between each utterance. Trevarthen (1979) and Stern (2000) indicate that musical features such as melodic contour, tonal intensity, dynamics and rhythmic patterns serve as crucial early models of emotional and social communication.

Until the age of ten months, babies will vocalize many different sounds; then, they will start focusing in playing around with the speech sounds of their mother language (Bates, Thal, Finlay, & Clancey, 2002).

A stage called ‘jargon babble’ (or intonated babble’), starts at around 12 months of age. This stage occurs with both the canonical babbling stage and the use of early words and is characterized by strings of sounds and syllables uttered with a variety of stress and intonational patterns (Stoel-Gammon, 1998).

The vocalization and babbling produced by most children likely serves an important function of helping children tune their phonological system (Bricker, 1992). Stoel-Gammon (Stoel-Gammon, 1992) summarized longitudinal studies which showed that babbling serves as a foundation for subsequent acquisition of speech and language. A late onset of canonical babbling is a predictor of risk for future speech and language pathology. The onset of this stage can be monitored effectively through parents’ interview (Oller, Eilers, Neal, & Schwartz, 1999).

Compared to babies with NH, babies who are deaf cannot be soothed by the parent’s voice and do not learn implications of tone and voice but they do vocalize from an early age. Their vocalizations are reflexive rather than intentional (Herman, 2004a). In addition, the more a baby practices babbling, the greater the opportunity to establish the auditory and kinesthetic feedback loops necessary for producing and monitoring his/her own speech (Stoel-Gammon, 1998). However, since babies who are deaf have little or almost no auditory feedback, and since feedback cannot occur in the absence of practice, their repertoire of vocalization tends to show differences from infants with NH from about six to nine months of age at which time their vocalizations dramatically diminish if they do not receive auditory feedback by means of amplification or a cochlear implant (Kent, Osberger, Netsell, & Goldschmidt-Hustedde, 1987; Koopmans-van, Florian, Clement, & van den Dikkenberg-Pot,

2001). Oller and Eilers (1988) found that infants who are deaf, even though they have been intensively stimulated and provided with auditory amplification, show substantial delay in the emergence of canonical babbling and also a decreased variety of consonants from eight months onward. The authors note that if one might ask why the children who are deaf *ever* produced canonical babbling, the most plausible response seems to be that however hearing impaired the children were, they did have a means of perceiving speech sounds - visually and through residual (amplified) hearing.

Some studies indicated that babies who are deaf and are exposed to sign language develop a form of hand babbling during the second half of the first year (e.g., Petitto, Holowka, Sergio, & Ostry, 2001; Petitto & Marentette, 1991; Schauwers et al., 2002).

Schauwers et al. (2002) indicate that children who are deaf and received cochlear implants need up to four months of exposure to sound in order to start babbling while hearing infants need six to ten months. The authors raise the question whether this is due to the more advanced maturation of the children with CI compared to the infants with NH who are much younger. They also cautiously conclude that one surely needs a certain amount of auditory stimulation for babbling to appear.

### **2.2.6 Gestures**

All children, whether hearing or deaf, use gestures to communicate and express their needs more effectively before the emergence of symbolic representation, namely spoken or signed language (Goldin-Meadow, 2000; Robinshaw, 1996). Iverson and Thal (1998) define gestures as actions produced with the intention to communicate and typically involve fingers, hands, and arms and also may employ facial features (e.g., lip smacking for 'cookies') or even the entire body (e.g., bouncing up and down for 'horse'). Gestures are used intentionally to convey meaning and information to the observer or to express a specific emotional state (Blake, McConnel, Horton, & Benson, 1992). The transformation of information does not include direct touch with the partner with whom the child communicates or the instrumental manipulation of that partner. Thus, pulling the mother's hand towards the kitchen is not considered by most of the researchers as a gesture, but pointing to a cookie which is placed on the kitchen table, is a gesture (Iverson & Thal, 1998).

A communicative and intentional gesture is also accompanied by eye contact,

vocalization or any other attempt to call for the other person's attention (Bates et al., 1979; Iverson & Thal, 1998). Caselli and Volterra (1990) describe a continuous developmental process starting between the ages of 8 and 14 months from the gesture of "showing", to "reaching", and later on to "giving". Much later, around 13 months the gesture of "pointing" appears. This indicates the disconnection of physical contact from the object, and the initiation of interaction with an adult. These four gestures are called *deictic* gestures (Masur, 1990).

The other category of gestures is the *representational* or *referential* gestures, which are conventional body movements or facial expressions. Unlike deictic gestures, they both establish reference and carry some fixed semantic content produced in various contexts (Iverson & Thal 1998). These gestures represent either an object (a ball, a car), cause and effect between actions (fell down, broke down) or social situations (bye bye, no). Caselli (1983) was the first one to point out the communicative nature of these gestures. Iverson and Thal (1998) summarize some studies by concluding that "...as the symbolic function develops, children's representational gestures gradually become more context flexible, are available to refer to absent objects and events and can be used for a variety of communicative functions" (p. 71).

Different studies (e.g., Butcher, Mylander, & Goldin-Meadow, 1991; Goldin-Meadow & Feldman, 1975) refer to the phenomena that children with HI born to hearing parents, who were not exposed to a specific language model, often use the gestural modality in order to express their different communicative needs because of their difficulties and frustration in acquiring spoken language. Some studies even show that the gestural system of children with HI is similar in content and structure to early language of young children with NH (Floven & Bonvillian, 1991; Goldin-Meadow, 2003; Morford & Goldin-Meadow, 1997). McAnally, Rose, and Quigley (1994) add that children who are deaf and hard of hearing use the same type of gestures as children with NH but they tend to expand on them and use them longer. However, there is a controversy in the literature regarding the level of gestural communication, whether it develops in a linguistic vacuum and how far it can develop in terms of its creativity and the development of structural-linguistic characteristics in a situation of deficient input (Fooks, 1998; Ringwald-Frimmerman, 2003). Only a few studies investigated the relationship between gestures and words in the language development of children who are hearing impaired. The sparse literature

implies that gestures, especially the referential ones, may function as a support communicative system for children with HI at the one-word stage (De villiers, Bilbeau, Ramos, & Gatty, 1993; Mohay, 1990).

### **2.2.7 The importance of early intervention**

Early intervention is a term that describes the need to begin habilitation services as soon as disability is confirmed. It is the course of action taken to achieve the proper steps to obtain the services needed by the child (Northern & Downs, 2002).

During the past decade, research has gained new insights in regard to the development of the brain and the nervous system. Technologies such as brain mapping and brain scan have helped to understand the developing brain in greater details than ever before. One very important conclusion is that the brain development that takes place in the first 12 months of life is more rapid and extensive than previously realized. It is known that the brain is not a rigid structure but a “plastic” organ, which can reorganize itself based on sensory and motor input. This phenomenon is known as *neuroplasticity*.

During the first three years of our life, the neurons in the cortex achieve maturation. Sensory activity stimulates the neuronal connections from the brain stem to the appropriate areas of the cortex. Then, the brain’s general organization does not change significantly. All this accumulative knowledge requires that more attention be focused on the importance of early childhood intervention (Nelson, 2000; Northern & Downs, 2002).

Scientists have shown that the developing brain is much more vulnerable to environmental influence than previously suspected. It is capable of being modified by both deleterious (stressors) and beneficial (enriched environments) experiences (Nelson, 2000). For example, malnutrition before birth and during the first years of life can seriously interfere with brain development and can cause neurological and behavioral disorders, including learning disabilities and mental retardation (Carnegie Corporation, 1994). Other environmental factors such as drug use and stress may also affect prenatal and early postnatal brain development (Nelson, 2000).

The phenomenon of auditory system plasticity is supported in animal experiments (Sininger, Doyle, & Moore, 1999). There is evidence that the developing nerve, brainstem nuclei, and auditory cortex have the capacity to change during normal development and during times of interrupted sensory input. Experimental



evidence showed also that reintroduction of sensory input after auditory deprivation induces further plastic changes, and deleterious effects may be reversed only during early developmental stages. Research evidence obtained in animal anatomic studies supports the view that a critical period may exist for intervention to ameliorate the experimentally created deficits. This means that during that window of time, the experience a person is exposed to, will have its peak effect on the development. After that period, the same experience will result in a reduced effect or sometimes even in no effect at all. The human brain growth spurts begin to slow down around 10 years of age. These physiologic findings, confirmed by modern neuroscience, show the importance of early intervention. Although the adult nervous system continues to lay down new synaptic connections as one learns new ideas and skills, never again will the brain be able to assimilate and master new information so readily as during the first three years of life (Northern & Downs, 2002).

A report of the Carnegie Corporation (1994) summarizes five key findings that should inform the efforts to provide children at the earliest possible age with a healthy start:

1. The brain development that takes place during the prenatal period and in the first year of life is more rapid and extensive than was previously realized.
2. Brain development is much more vulnerable to environmental influence than was ever suspected.
3. The influence of early environment on brain development is long lasting.
4. The environment affects not only the number of brain cells and number of connections among them, but also the way these connections are "wired."
5. There is new scientific evidence for the negative impact of early stress on brain function.

Nelson (2000) refers to two key cognitive systems that are likely to be central to the success of early intervention that target intellectual development (p. 211):

- The ability to remember and recall events (i.e., explicit or declarative memory);
- The ability to engage in planning strategic activities (executive functions).

Sharma, Dorman, and Spahr (2002) emphasize the fact that in the absence of normal stimulation, there is a sensitive period of about 3.5 years during which the human central auditory system remains maximally plastic. They write that plasticity remains in some, but not all children until approximately age seven and after this age, plasticity is greatly reduced. They recommend taking these relevant data into consideration when dealing with the issue of when best to place a cochlear implant in a congenitally deaf child. This has recently been validated in the growing body of research on the topic. For example, Kirk et al. (2002) examined the effects of age at implantation on the development of communication abilities in 73 children with early implantation. The children who underwent implantation before three years of age had significantly faster rates of language development than did the children with later implantation (which was before five years of age). In another study of 47 implanted children ranging in age from 9 to 48 months at implantation, Hammes et al. (2002) found that the best outcomes occurred in children who underwent implantation at or before 18 months of age. Several of these infants even demonstrated age-appropriate spoken language skills (see also Huston et al., 2003; McConkey et al., 2004).

Nelson (2000) hopes that the understanding of the principles and methods of developmental neurobiology will ultimately facilitate the design of more effective intervention strategies and more thorough evaluations of their impacts.

With regards to the beneficial experience that can modify the brain, parent-child relationship is both a context and a mediator of optimal child development. Prizant, Wetherby, and Roberts (2000) indicate that as communication enhancement approaches have become more focused on interactional and relationship variables rather than child variables alone, a primary intervention goal is to work closely with caregivers, who have become primary intervention agents. Clinicians are trying to discover interactive styles and strategies that will best support a child's communicative development and socio-emotional competence (see Prizant, Wetherby, & Roberts, 2000, p. 293, for reviews). As Mashie et al. (2005) write: "It cannot be stressed enough that subsequent delays in one or more areas of development may result from failure to facilitate age-appropriate development of communication skills" (p. 4).

The increased acknowledgment in the value of music therapy has resulted in its incorporation into many health and educational settings as part of early intervention programs in medical, social, psychological, and/or cognitive areas due to its positive

outcomes. Some examples of these may be found in Humpal, 1990; Plahl, 2004; Standley, 1991; Standley & Hughes, 1996.

### 2.2.8 The importance of play

Play was chosen in this study as the control condition (see section 3.1) due to its relevance to the young age of the children. Play is so important for optimal child development that it has been recognized by the Office of the United Nations High Commissioner for Human Rights as a right of every child, whatever their background, religion or family structure (Ginsburg et al., 2006). There is an abundance of literature on play. This section will offer only a brief glimpse into that vast topic.

The literature that deals with the importance of play covers a variety of different approaches (e.g., Hughes, 1991; van Hoorn, Nourrot, Scales, & Alward, 2007), such as:

- ***The cognitive-development approach of Piaget*** (represented also by Jerome Bruner and Brian Sutton-Smith), which focuses on what children are doing with objects at the point where they start to use an object for another purpose rather than how it is usually used in daily life;
- ***The psychoanalytic approach*** (represented by Sigmund Freud, Anna Freud, and Erikson), which focuses on those feelings that are expressed during play as well as on the healing effect of play;
- ***The educational approach*** (represented by educators like Farbel and Montessori), which focuses on the purposes that play can be used for and not on the reasons for children's play.

Play is easy to recognize but very difficult to define (Bergen, 1988, pp. 11-13). The increase in play research has led to some progress in defining play. The Department for Culture, Media, and Sport (DCMS), UK, 2004 defined it as “what children and young people do when they follow their own ideas, in their own way and for their own reasons“. Among the many attempts to define play and the differences in opinions, Rubin, Fein, and Vandenberg (1983) characterize play by six dispositional factors. The first four are necessary to the definition of play:

- ***Intrinsic motivation:*** Motivation for play comes from within the individual, and activities are pursued for their own sake.

- ***Process over product:*** Children's attention in play is focused on the activity rather than on its goals. The absence of pressure to achieve a goal frees the children and allows them more flexibility.
- ***Organism rather than stimulus dominated:*** Play, unlike exploration, is guided by the organism-dominated question "What can I do with this object?" while exploration is guided by the stimulus-dominated question "What is this object and what can it do?" Play occurs when the objects are familiar and it serves to interest the child and maintain a particular level of arousal" (p. 699).
- ***Non-literality:*** Internal reality takes precedence over external reality. Therefore, new meanings are given to objects and actions are performed differently from when they occur in non-play settings. This "as if" stance toward reality allows children to ignore here-and-now constraints and experiment with new possibilities.

In addition, Rubin et al. (1983) indicate two other characteristics of play that are not necessary to its definition: Freedom from externally imposed rules, and active engagement. These two exclude two important forms of play: games with rules and daydreaming. The authors explain that certain games do involve following pre-established rules but in play, participants can change the rules according to their choice, and thus freedom from external rules is maintained.

During the present century, most of the theorists who write about play indicate the possible benefits of play to children's development. In the last decades there has been a considerable increase in the number of research studies that investigated the relationship between play and child development (Johnson, Christie, & Yawkey, 1987). Kransor and Pepler (as cited in Rubin, 1980) presented three basic views of the relationship between play and developmental skills:

1. Play reflects the developmental level of the child and, therefore, can be used as a diagnostic tool.
2. Play provides an opportunity to practice skills.
3. Play is a causal agent in developmental change.

Play is essential to development because it contributes to the cognitive, physical, social, and emotional well being of children and youth. (Ginsburg et al., 2006).

Play is a vital factor for healthy brain development and is the vehicle through which young children become involved in the world around them. It allows them to learn by exploring things, taking risks, meeting challenges and engaging in problem solving. Play calls upon the children to hone their language skills, their symbolic thought, as well as the ability to plan, organize and make decisions. In play, the stimulation is particularly valuable for children with special needs (van Hoorn et al., 2007).

Play can be used as a vehicle for expressing emotion, ideas and fantasy, channeling aggression, learning to modulate and regulate emotion, practicing storytelling and resolving problems and conflicts. It is usually characterized by pleasure and enjoyment. Even if it is accompanied by apprehension and fear, it seems to have a pleasurable quality for children. They can repeat the same experience several times and creatively work out their fears through role playing and dramatic play with peers or adults caregivers. As a result, they gain confidence in their ability to face the more complex world problems as they grow up.

Play that is not directed by adults is an important element that develops the child's ability to share, negotiate and resolve conflicts and to learn self-advocacy skills.

Children's development is critically mediated by appropriate, affective relationships with loving and consistent caregivers as they relate to children through play. The interactions that occur through play may provide the warmth and guidance that enhances communications and help build long lasting relationships. The parents are then offered an ideal opportunity to engage fully with their children and to gain a fuller understanding of their perspective. In addition, for those children who are less verbal, play may provide an avenue with alternative possibilities for self expression (Ginsburg et al., 2006, Russ, 2004).

The two conditions in this study, play and music, are described by van der Linde (1999), who refers to play and music as related activities which are both important for the child's cognitive and emotional development as a well-rounded adult. Play and music are important vehicles for-

- Developing mental capacity and intellect and forming the basis of language building;
- Helping the child to master his/her physical self, which results in improved

self-confidence and thus leads to a better self-image;

- Developing the affective aspects by enabling children to express feelings and relieve tension in an acceptable way;
- Developing social roles;
- Developing creativity.

The author concludes that play and music have endless possibilities and potential for early childhood (see also Bunt, 1994, pp. 96-98).

Further theoretical perspectives and opinions on play can be found in Casey, 2005; Isenberg & Jalongo, 1993; Klugman & Smilansky, 1990; Pitcher & Schultz, 1983; Riddick, 1982; Singr & Singer, 1990. Van Hoorn et al., (2007) present several key resources on play at the end of each chapter in their book as well as an extensive bibliography.

### **2.2.9 Music therapy as a facilitator of communication**

Gaston (1968) states that “music is communication... but more often than not it is, or functions as, nonverbal communication. It is the *wordless* meaning of music that provides its potency and value” (p. 23). Music is a language. Musical parameters such as rhythm, pitch, loudness, timbre, accent, etc., are also components of language (see section 1.2). As such, the therapeutic use of music may facilitate communication with persons who are inaccessible, in varying degrees, through the spoken word because of deficits in their communicative skills (Boxill, 1985). Where impaired development, either mental physical, or combination of both, hampers normal communication, music provides a “supportive, communicative link (both inter-and intrapersonal).” Sekeles (1996, p. ix, clause 6).

Research into the compositional elements of communication has directed attention to the areas of infant’s abilities and parent-infant interaction. Microanalytical techniques have contributed to the study of these interactions. In a study by Malloch et al., spectrographic analysis showed that the mother and infant entered into rhythmically coordinated communication (Malloch, Sharp, Campebell, Campebell, & Trevarthen, 1997). Stern (2000) and Trevarthen (1999) describe the dialogues between mothers and infants by using musical terms such as pitch, timbre, and tonal movements as well as pulse, tempo, rhythm and especially, timing.

Kempton (1980) studied interactions of infants and their caregivers. A microanalysis of both film and audio footage showed the use of rhythmical patterning in their communicative interactions. This patterning conveys a sense of pulse that each partner can use to structure behavior and coordinate with the other. A shared pulse is also the basis of any improvised musical interaction (Schögler, 1998). In addition, infants are able to predict patterns in rhythmically structured behavior and to synchronize their expressions with the rhythms of an adult. This synchrony is too rapid to be reflex-based behavior, and it confirms the communicative function of such interactions. Beebe (1982) made several significant observations, which showed that both mother and infant are ‘playing’ in unison and not taking turns. This mode of interaction can be up to 40% times greater than what occurs in a polite adult conversation. Fridman (1981) reports that infants and mothers show individuality of expression already in ‘proto-conversations’. That means that the relationship they are creating together is a personal one from the start. Holck (2002) refers to this point and indicates that “music is made up of the same elements that form the communicative bond between parents and infants” (p. 184). She created a term called ‘commusical interplay’ which is a combination of the words ‘communication’ and ‘musical’ to describe the interaction in music therapy. She describes ‘response-evoking techniques’ which are used by music therapists, e.g., imitation, turn-taking, pausing or ‘freezing’, expectation, and variations on a theme. Holck indicates that these techniques are similar in their character and function to the way parents elicit responses from their infants, and emphasizes that when the means is music, the effect is markedly increased. Nolan (1994) finds similarities between mother-infant interaction and terms that are related to clinical improvisation. In both, the infant’s vocalicity is validated through the mother/therapist responses and develops into non-verbal language that expresses emotions and wills. Trevarthen and Malloch (2002) discuss a term called “communicative musicality”. They indicate that this term is used to explain using music to converse emotionally with others. It is explained as the art of human companionable communication, which consists of our innate abilities, functioning from birth, for being able to move sympathetically with another. It is the vehicle which carries emotion from one to another. Communicative musicality is vital for companionable parent-infant communication and is comprised of three elements which are attributes of human communication and are particularly exploited in music:

1. *Pulse* is the regular succession of discrete behavioral steps through

time, linking the present to the past, representing the “future creating” process by which a subject may anticipate what might happen and when.

2. *Quality* consists of the contours of expressive vocal and body gesture shaping time with expressive movement.
3. *Narratives* of individual experience and of companionship are built from the sequence of units of pulse and quality found in jointly created gestures- how they are strung together in chains of expression that generate affect (p. 11).

The music-like relationship observed between parent and infant reveals the raw materials that are utilized in music therapy (Trevarthen & Malloch, 2000). Wigram and Elefant (2008) indicate that communicative musicality is the principle of human motivation. They refer to the fact that the therapist uses different musical techniques to support the natural motives of communicative musicality, in order to create a potential for mutual experience. This experience resembles the intuitive empathy of communication that is an essential element in the development of all children.

Northern and Downs (2002) describe several studies, which demonstrated that neonates move in precise and sustained segments of movements that are synchronous with the articulated structure of speech (p.134). Also for Trevarthen (1980) language is embedded in an innate context of non-verbal communication.

Music therapists use music experiences as a means of communication and for creating relationship of different kinds, while using these relationships as dynamic forces of change (Bruscia, 1987). Nordoff and Robbins (1977), in their model of “Creative Music Therapy” state that every child, regardless of handicap, has an innate musicality, a part of the inner self which responds freely and openly to music experiences, finds it meaningful and engaging. When the child is disabled in some way, the music child is encased within what they call the “condition child”- The self that the child has been able to develop up to the present, and its responses to music are initially fragmented or reflexive. In music therapy, the inherent, inborn musicality can be reached.

Wigram et al. (2002) write that music making involves taking turns, sharing, reciprocal interaction, intersubjectivity and vocal/verbal expressions. By using the elements of music to create communicative intentionality, the therapist and client



develop a shared repertoire of events that have meaning and context.

Anecdotal publications and several controlled research studies reported increased communicative responses demonstrated in music therapy carried out primarily with children with developmental disabilities. Elefant (2002) reviews the abundant literature concerning this population and writes that music therapy may increase responsiveness, and enhance choice-making opportunities. There are other studies which proved that music therapy has a positive effect on children's social and preverbal skills such as response, initiative, imitation, vocalization and turn-taking (e.g., Aldridge, Gustoff, & Neugebauer, 1995; Elefant, 2002; Holck, 2004; Müller & Warwick, 1993). Bunt (1994), in the Hackney project, reported that music therapy significantly increased visual attention and increased frequency and duration of turn-taking activities in children with autistic spectrum disorder. Holck (2002) transcribed child-therapist musical interaction processes. Through microanalysis she found that some children with severe communication difficulties demonstrated a variety of non-verbal social initiatives towards the therapist. The initiatives ranged from eye contact as indications of turn-giving/taking, head nodding and smiling, to musical variations involving rhythmic changes and play actions that served as catalysts for continuing the interaction. Joy and emotional synchrony were among other significant behavioral features.

Darrow and Gfeller (1996) point out that without communication, one is cut off from the world. The isolation that people with HI may feel, affects psychological, social and intellectual development. Therefore, the authors view the aims for music therapy with these clients as related to communication: auditory training, speech production and language development. Trevarthen and Malloch (2000) state that music therapy offers a form of communication and mutual expression that can draw people together and give them a way to explore narratives of feeling that engender courage and joy. Oldfield (2006) indicates that music therapy can be an ideal setting for exploring and expanding basic exchanges between adults and children. Janert (as cited in Oldfield, 2006) describes these basic exchanges as "games of pure interaction".

The topic of music and music therapy for children with HI will be presented in the next section.

## 2.3 Music, music therapy, hearing impairments, and CI<sup>19</sup>

### 2.3.1 Music, music therapy, and children/adolescents with hearing impairments

Perception of music is often more accessible to persons with HI than the complexities of the speech signal due to the variety of frequencies and intensities of which music consists. Due to its flexibility, music can be modified according to the person's hearing level as well as to the language level, maturity and music preferences. Only a small percentage of persons with HI do not hear at all (Darrow, 1989).

The topic of music and music therapy for children with HI has been extensively covered in the researcher's master's dissertation (Amir, 1982). Therefore, only research and/or anecdotal literature from 1983 onward to 2004 will be presented in this section according to the following sub-topics, i.e., auditory training through music, rhythm, pitch, vocal and speech production, etc. However, to avoid redundancy, there will be no elaboration on the importance of each sub-topic for persons with HI.

The subjects' level of hearing loss is not always given in the following studies presented here. However, all these studies focused on children with moderate to profound prelingual hearing losses.

***Auditory training through music:*** Darrow (1985, 1995) states that the goal of auditory training is to teach the complex task of listening, a much more involved task than the physical act of hearing. She indicates that children with HI must learn to interpret sounds and attach meaning to them. In her article from 1989, she refers to the commonalities between the music parameters and speech, which allow music and music therapy to provide an alternative and pleasurable tool to enhance traditional auditory techniques. In an article based on the researcher's master's dissertation (Amir & Schuchman, 1985), the effect of auditory training within a musical context on the use of residual hearing as well as on social, emotional and task-oriented behaviors of preschool children with severe to profound HI, was investigated. Two groups of six children in each, aged 3.5-4.5, were matched on variables related to biography, socioeconomic status, hearing impairment, and cognitive functioning. The experimental group received 24 sessions (twice a week, 30 minutes per session) of

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<sup>19</sup> The literature review on music and cochlear implants was updated until 2004; therefore, any studies that emerged later will be considered in the discussion chapter.

auditory training through music and demonstrated a significant increase in the use of residual hearing on the levels of discrimination and recognition as well as more effective use of their intellectual potential, compared with the control group. Regarding the social, emotional and task-oriented behavior, a marked difference on the assessment of the children's pictorial creation was detected in favor of the experimental group. The study implies that auditory training through music, conducted in groups, is effective and may serve as a useful adjunct to other techniques for maximizing the use of residual hearing, and thus, provides experimental support for what is already known about the value of music for children with HI.

***Rhythm:*** Darrow (1985) cites David Ely Bartlett, a pioneer and an advocate of music education for persons with HI, who, in 1848 wrote the following statement, which holds true today as well:

In estimating the pleasure that is derived from music, it must not be forgotten that the sensation or perception of sound is not the whole of the pleasure produced by music. A considerable part of this pleasure results from the underlying rhythmic character of the movement which can be perceived by the sense of sight alone to a considerable extent, and yet more perfectly by sight and feeling together... (unknown page number).

Darrow (1984) compared the rhythmic responsiveness of 62 public school students with NH and with HI (from severe to profound hearing loss), ages 9-16, with a mean age of 12. The students with HI performed as well or better than those with NH regarding beat identification, tempo change, accent as a factor in meter discrimination, and rhythm pattern maintenance (i.e., maintain a given rhythm as in an ostinato). However, there was a significant difference between the two groups with regards to melodic rhythm duplication and rhythm pattern duplication. Age and gender did not yield significant differences. In addition, the degree of hearing loss was not related to the performance level on the tests, with the exception of the students with profound hearing loss. Darrow also investigated the relationship of rhythmic responsiveness to the suprasegmental (i.e., nonlinguistic) aspects of speech perception that involve rhythm discrimination in students with HI. Results revealed significant correlations between the rhythmic responsiveness subtests that measured beat identification, melodic rhythm duplication and rhythm pattern maintenance

performance with the two suprasegmental speech perception tests. This study supports the position that hearing impairment does not vitiate innate rhythm responsiveness.

In another study of Darrow and Goll (1989), 29 students, from severe to profound hearing loss, identified rhythmic change by using (a) auditory skills only, and (b) auditory skills supported by vibrotactile stimuli. The latter condition yielded better performance. The authors therefore recommend using vibrotactile stimuli in teaching rhythmic concepts to children with HI.

Another study which examined the feasibility of using a commercially-available computer program ("Toney listens to music") in testing differences in the discrimination skills of children with HI and children with NH on listening tasks involving changes in tempo, rhythm patterns, intervals and simple melodies (Coffman, Gfeller, Darrow, & Coffman, 1992). Significant differences between the two groups were found only in the pitch perception tasks- interval and melody discrimination. Though the appropriateness of the computer program as an assessment tool was not definitive, this study does indicate the value of exposure and access to music experiences for these children.

Darrow (1995) indicates that in the studies where subjects with HI were asked to reproduce a given rhythm or beat, their performance was dependent on their perception of the stimuli. Thus, in an attempt to control this variable, Darrow and Bolton (as cited in Darrow, 1995) tested the ability of mainstreamed children with HI to read and perform selected rhythms. No significant differences were found between the rhythmic performances of children with HI when compared with children with NH.

**Pitch:** Ford (1988) investigated (a) the effect of musical experience and age on the ability of 39 children with HI, from two age groups (ages 6 to 9 and 11 to 12) to discriminate pitch, and (b) the relationship between pitch discrimination and hearing levels, academic achievement levels in reading and mathematics, and gender. No differences were found for pitch discrimination due to age or music training, but at 250 Hz the subjects performed more accurately than in 500 Hz. Ford recommends listening activities for these children that are in an optimal pitch range (which is approximately around 'B' below middle 'C' to an interval of a twelfth above middle

'C') as well as starting with gross pitch discrimination, and gradually introducing smaller intervals.

Darrow (1992) examined whether pitch changes in patterns of different intervals of vibrotactile stimuli (via Somatron, a manufactured vibratory platform mattress) could be identified by 17 children with HI (severe to profound hearing loss). Results revealed that more pitch changes were identified under the use of auditory skills supported by the vibrotactile stimuli than under the use of auditory skills only. Thus, the tactile sense is a valuable channel through which these children can process selected tonal stimuli in addition to the use of their auditory skills.

Two case studies are described by Darrow and Cohen (1991) that examined the effect of programmed pitch practice on pitch matching skills of two girls with HI. The programmed pitch practice was done via the Pitch Master- (an electronic device which measures a single and/or a melodic vocal response against a pre-recorded reference) For the 12- year-old girl who had a severe hearing loss, results revealed a significant improvement ( $p < .05$ ) in her ability to match a given pitch between the pre- and the posttest evaluation. Daily recorded data showed similar vocal performance accuracy scores across all sessions. There was improvement in vocal accuracy also for the second subject, 11-year-old girl with a profound hearing loss. Suggestions for procedures which can be utilized with other children with HI are given for improving vocal quality and increasing vocal repertoire.

See also the study by Coffman, Gfeller, Darrow, & Coffman, 1992, in the previous sub-section on rhythm.

**Timbre:** Darrow (1991) carried out two studies to find preferences for timbre and musical instruments of children with HI (severe to profound). In the first study, videotapes of the children's playing behaviors were analyzed for instrument preferences by three measures: the order in which the instruments were chosen, the amount of time spent playing each instrument, and a report of preference given to the experimenter in sign language. Signed responses of 34 children (grades 1 through 4), showed that the violin and trombone were the most preferred instruments. It seemed as if novelty and aural feedback were two factors related to the children's interest in specific instrument. The agreement among the three measures was not significant. Twenty one children (grades 2 through 4) participated in the second study. No strong preference or dislike was found for a specific timbre among the younger children.

Although preferences were more apparent in older children, Darrow indicates that these preferences may have a cultural bias. She recommends assessing individual preference for timbre, synthesized sounds or actual instruments and using it in auditory training exercises as well as in music therapy.

***Vocal and speech production:*** Since speech prosody (rhythm, intonation, rate and stress) conveys important contextual information, Darrow and Starmer (1986) investigated the effect of vocal training on the fundamental frequency, frequency range and speech rate on the speech of children with HI (severe to profound) since they tend to have a higher fundamental frequency and vary pitch less, and thus, produce problems in speech intelligibility. Results showed that vocal training (i.e., free vocalizations, vocal imitation, rhythmic vocalizations, and vocal phrasing and dynamics) and singing songs in lower keys may help modify the fundamental frequency and frequency range of the children's speech.

In a preliminary study on the efficacy of musical speech rhythm training, Gfeller (1986) employed such a training program for nine children with HI and analyzed pre and post speech samples on intelligibility, speech rate, prosodic features and number of utterances per second. Five out of nine children improved their intelligibility and speech rate, six improved prosodic features and seven had increased number of utterances. Two children declined in most speech intelligibility factors, a finding which indicated that this approach is not appropriate in all cases and further research is needed.

Staum (1987) used a 40 days treatment program (daily sessions) of visual notation system in an attempt to improve speech prosody of 35 children with HI (ages 3-12), by practicing words of with progressive complexity with the appropriate rhythmic and inflectional structure. Speech prosody improved significantly as well as significant generalization and transfer of learning. The youngsters capable of reading made the greatest gains in transferring their skill to novel verbal material.

Darrow (1990) examined whether frequency adjustments of auditory stimuli to accommodate the individual audiological curves of children with HI (moderate to severe hearing losses) can assist them with pitch discrimination tasks and consequently, with their vocal production. The data provided an adequate useful start according to the author, but she concludes that these data should be viewed with

caution and that further development of special techniques is needed to assist this population.

Regarding singing of children with HI (sever to profound hearing loss), Darrow (as cited in Darrow, 1995)) found that the mean range of their singing is significantly smaller and the midpoint is significantly lower. She indicates that this is in contrast with the fact that common tonal characteristics of deaf speech generally include higher fundamental frequency than in normal speech and frequently no variations in pitch.

Bang (1998) has done a research project on the use of tone bars for improving the voice of children with profound hearing loss, aged 5-15. Bang indicates that these tone bars have a frequency range of 64 to 380 Hz, where the greatest part of the deaf has some residual hearing, a fact that enable activating and utilizing the residual hearing through work with these bars. Analysis of the effect of musical speech therapy with the bars on the qualities of the subjects' voices and vocal function included parameters such as tone, intensity, frequencies, intonation, reduction of nasality, etc. The analyzed material served as a basis for developing two mathematical models in order to qualitatively evaluate the vocal improvement of the responding and the spontaneous voices before and after the training with the tone bars. The analyses as well as the models are not presented in this article.

***Dynamics:*** No research was found by the researcher concerning the area of dynamics and children with HI during the years covered in this section (1983-2004).

***Language development:*** Campbell (2000) stated that “the systems the brain uses to process music are either identical to or fundamentally entwined with the systems used in perception, memory, and language” (p. 22). Gfeller and Darrow (1987) suggest that singing or signing self-composed songs allows persons with HI to express or illustrate thoughts and feelings that may be too difficult to produce in written form. They write: "The use of songwriting and song-signing not only provides variety of method and reinforcement of other language training, it emphasizes emotional and social components as well as syntactic elements- both important for effective and meaningful communication" (p. 234). Gray-Thompson (1988) examined whether visual aids such as picture song books can be used as a tool to teach sight vocabulary to children with HI who used American Sign Language as their primary

mode of communication. Thirty words from songs were selected by classroom teachers as appropriate to the vocabulary needs of their students and pictures depicted these "key words". Sight vocabulary was divided into word recognition and concept recognition. Following six weeks of intervention, all three groups scored significantly higher on the post-test for word recognition and concept recognition. The author concluded that picture song books are an effective tool for teaching selected components of sight vocabulary.

Gfeller and Baumann (1988) describe assessment procedures appropriate for language development goals in music therapy with clients with HI. The authors review language problems of children with severe hearing loss as well as major treatment goals and approaches in speech pathology and music therapy.

***The effects of music therapy on the wholesome development of children with HI:*** Van Deventer (as cited by Darrow and Gfeller, 1996) employed a 12 session music therapy program to examine its effect on the self-concept of a group of children with HI (grade one). The program focused on rhythm and body image. The statistical results confirmed the therapists and teachers' observations of improvement in self-concept of these children. Staum (1987) refers to the positive results in speech prosody (see previous sub-section on speech), generalization and music learning, and claims that all these areas enhance the self-esteem of children with HI.

***General implications for music educators:*** Darrow and Gfeller (1991) examined the status of public school music instruction for students with HI as well as factors contributing to their successful mainstreaming in the regular music classroom. Results from questionnaires revealed that more than half of all these students attend music classes. Lack of suitable curricula in music for such students was found as well as appropriate methodologies, materials, and activities that were identified as helpful in integrating these students into the regular music classroom (see also Ford & Shroyer, 1987; Gfeller, Darrow, & Hedden, 1990; Shroyer & Ford, 1986; Spitzer, 1984). Some of the findings in a study by Darrow (1993) on the role of music in the deaf culture, showed that the students with HI are involved in music, enjoy most singing/signing songs, listening to music, and moving/dancing to music. Darrow (1985) recommends music experiences even for children with severe HI, since they can receive sensory satisfaction and valuable auditory training from these experiences. Birkenshaw-



Fleming (1993) refers to four main ways that persons with HI can use music: for relaxation, developing listening skills, encouraging language acquisition, and when combined with movement- it can foster good posture and a graceful way of walking and moving.

***Implications for music therapy:*** Darrow (1995) indicates that although the areas of music perception and performance of persons with HI have been more investigated than the area of music therapy, some of the findings are relevant to music therapists who work with these clients, such as:

- Participation in music activities may result in musical as well as non-musical benefits, e.g., speech production, listening, language and academic skills.
- Rhythmic aspects of music increase responsiveness of persons with HI more than the tonal ones.
- To meet therapeutic goals, greater exposure to musical stimuli, both in duration and intensity, is required than in the case of persons with NH.
- Aural feedback is provided more usefully by sustaining instruments than by percussive ones.
- Use of moderate tempi may assist in greater rhythm performance accuracy.
- Verbal rhythmic and intonational accuracy may be increased by reading standard music notation than by relying on the ear to imitate or learn by rote.
- Vocal intonation in singing and speaking can be improved by participating in vocal activities; however, the vocal range of song literature should be taken into consideration with singers with HI.
- Vibrotactile stimuli may serve as a supplemental tool in music instruction of persons with HI.
- Persons with HI are capable of improvements in ear training and may develop a more sensitive ear over time as do persons with NH.
- Persons with HI demonstrate certain musical preferences regarding sound source, intensity, and listening conditions.
- When instructing persons with HI, particular attention should be given to amplification and sound quality.

For further background information on the above topic and for more material, the

reader may refer to Darrow, 1989, 1995; Darrow & Gfeller, 1996, and annotated bibliography in-

<http://people.uwec.edu/rasarla/research/litandgoals/Hearing/mutx.hearingimpaired.htm>

No additional research was found by the researcher during the years 1999-2004 on this topic. It seems as if research moved towards investigating the topic of music and cochlear implants.

### **2.3.2 Music and adults with CI**

Music is both an art form and a social activity making its two primary functions aesthetic enjoyment and entertainment. Currently, research is accumulating regarding music perception and appreciation of implant recipients. A greater understanding of this subject may address such issues as user satisfaction with daily functioning (Stordahl, 2002) and music listening as part of it (Gfeller, Witt, Mehr, Woodworth, & Knutson, 2002c).

While the processing and transmission of selective aspects of the sound wave have proven quite successful in speech perception by implant recipients, there are serious limitations with regard to the representation of musical sounds. Specifically, cochlear implant recipients do not receive a normal representation of pitch and timbre, which are both important structural features in music (Gfeller et al., 2002a). For example, there is not an orderly relationship between the frequency (Hz) of the sound source and the pitch perception by the implant recipient of how high or low a note sounds. A person with NH would hear an ascending C major scale as an orderly progression of pitches from low to high, while an implant recipient may hear this same scale as a random array of beeps or tones (Fujita & Ito, 1999; Gfeller, 1996). This is true for harmony as well (Gfeller, 2001).

***Rhythm***<sup>20</sup>, which embraces the temporal features of music, is the musical parameter that is the most readily perceived by CI recipients. The beat unit, tempo, rhythmical patterns, pauses, and meter- all have a cardinal role in music recognition for CI recipients. In a study by Gfeller et al (2002a), the authors compared song recognition and pitch perception of adult CI recipients and adults with NH and tried to identify factors that influence the ability of implant users to recognize familiar

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<sup>20</sup> The reader may refer to the researcher's master's dissertation for detailed explanations of the musical parameters (see section 1.3).

melodies. Forty nine experienced CI recipients and 18 adults with NH were tested on familiar melody recognition. The adults with NH were significantly more accurate than the CI recipients. Two thirds of the melodies that were correctly recognized included a rhythmic line that was highly memorable and served as a cue for the listeners. The CI recipients performed similarly (almost normally) to the adults with NH in tempo discrimination tasks, but showed considerable variability in perception of complex tones and pure tones. In a related study done by Kong, Cruz, Jones, and Zeng (2004), CI recipients performed normally in tempo discrimination, and were able to identify almost two thirds of melodies of familiar songs that contained rhythmic information. However, they were significantly poorer in rhythmic pattern identification and melody recognition compared to the listeners with NH. Melody recognition requires perception of temporal (rhythmic) and spectral (pitch) cues. The CI recipients mostly relied on the rhythmic cues in melody recognition tasks. Fujita and Ito (1999) found that the eight adults with CI recognized the melodies of four songs according to verbal cues rather than by musical qualities such as tones and musical intervals (The closest discrimination was 4 semitones). Leal et al. (2003) asked 29 adults with CI to listen to 10 pairs of musical pieces and discriminate whether the pair of items were the “same” or “different” as well as determining the point of change. In the 10 pairs presented to them, one was different in the duration or intensity of the notes. A total of 59% of the CI recipients were able to discriminate and 41%- to identify the point of change. The researchers also found positive correlations between speech discrimination and rhythm tasks.

***Pitch*** perception is crucial for identification and enjoyment of music. Melodies, which are part of music, are created when a sequence of pitches (single tones) are successively organized to build a phrase of varying musical contour and interval.

For a CI recipient to hear and appreciate music in the same way as a person with NH does, he/she must be able to discriminate between subtle changes in pitch (frequencies) as well as musical intervals (Limb, 2000). It appears that many implant users can perform discriminations of pitch and rhythms, especially when electric pulse stimuli are applied (Gfeller, Knutson, Woodworth, Witt, & DeBus, 1998; Pijl, 1997; McDermott & McKay, 1997). However, pitch and timbre information through speech processors is not always perceived with precision (Limb, 2000). Fujita and Ito (1999) indicate that there is a great variability among CI recipients in their ability to

discriminate musical intervals, from discriminating changes of four semitones to inability to identify changes of an octave. (See also the study by Gfeller et al. (2002a), in the previous paragraph, on song recognition and pitch perception).

*Timbre*, or tone quality or color, is another fundamental feature of music. Recognition of a musical instrument is not required to derive pleasure from music. What is more important is the satisfaction of the CI recipients regarding the extent to which the sound is pleasing (Gfeller et al, 2002c). Therefore, Gfeller and other authors examined the appraisal and recognition of timbre (four different musical instruments) by adults with CI compared to adults with NH (Gfeller et al., 1998). The latter were able to recognize all of the instruments with significantly greater accuracy than implant recipients. Performance on timbre perception tasks was correlated with speech and cognitive tasks. Results from another study (Gfeller et al., 2002c) support this study as well. In the study of Gfeller et al., subjects were asked to appraise the overall pleasantness of recorded instruments (a 7-note sequence of equal-duration notes). Whereas prior research indicates that adults with NH tend to rate musical sounds with more high-frequency energy with the verbal descriptor “brilliant”, the CI recipients rated it as significantly more scattered (i.e., noisy) and dull in tone quality than did the adults with NH. The authors relate these findings to the limitations of the implant in transmitting key structural features of music as well as to the poorer nerve survival in the basal region of the cochlea, which is stimulated by the implant in response to higher-frequency sounds.

One more finding on timbre was that adults with CI showed greater ability to identify percussive instruments, such as the piano, in comparison with woodwind or brass instruments (Gfeller et al., 1998; Gfeller et al., 2002c; Gfeller et al., 2002b).

Additional numerous studies investigated the ability to discriminate between different musical instruments, i.e., different timbres (e.g., Fujita & Ito, 1999; Gfeller & Lansing, 1991; Leal et al., 2003).

Other studies aimed to determine perceptions of rhythm, pitch, melody, and timbre found that-

- CI adult recipients scored better on rhythm as opposed to tonal and harmonic perception tests (subjects with NH showed higher scores for melodic perception).

- They exhibited greater accuracy for music with “structured” rhythms as opposed to unstructured rhythms.
- They preferred isolated rhythmic patterns over rhythmic with harmonic patterns and were less accurate in a same- different comparison when melodic patterns included small pitch changes (Gfeller & Lansing, 1991; Gfeller, Woodworth, Robin, Witt, & Knutson, 1997).

McDermott (2004) summarizes the most significant findings of past research on music perception:

1. Persons with CI, on average, perceive rhythm on a par with persons with NH.
2. Although technological advancements of sound processors have been made in the last decade, this has had little impact on improving CI users’ recognition of melodies that are not accompanied by rhythmic or verbal cues.
3. Determining perception of timbre through procedures that require CI users to identify sounds of musical instruments has not proved satisfactory.
4. The quality of musical sounds is rated as less pleasant by people with CI than by those with NH.
5. Through use of auditory training programs created specifically for presentation of structural musical listening experiences to people with CI, an improvement may come about in the subjective acceptability of music that is heard via the CI.
6. Innovative sound processors using both temporal and spatial patterns of electrical stimulation may improve pitch perception by overcoming current limitations of signal coding in the existing implant systems.
7. CI recipients with adequate residual hearing in the low frequency range may receive a combination of electrical and acoustic stimulation. This is likely to improve their perception of music.

Rubinstein (2007)<sup>21</sup> notes, that there is currently no evidence that CI devices manufactured by different companies differ in their *music perception* outcomes. That does not mean that there is no difference, but just that no validated study has

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<sup>21</sup> Prof. J. T. Rubinstein, University of Washington, Seattle (personal communication, December 18th, 2007). E-mail: rubinj@u.washington.edu

compared devices in a large population. In addition, Leal et al. (2003) point out that no studies today have proved an advantage in music perception for bilateral CI users.

The previous paragraphs related to specific isolated structural features of music, but consideration should be given to the experience of music as a gestalt, which combines rhythm, melody, harmony and timbre.

*Music listening and enjoyment* is problematic for many adult CI recipients, who describe the sound quality of music as scratchy, squeaky, tinny, booming, unnatural, mechanical, or noise-like (Gfeller, Chrsit, Knutson, Witt, & Mehr., 2003). Similarly, Leal et al. (2003) write that generally speaking, listening to music is unpleasant after cochlear implantation. In their study, 25 CI recipients (86%) presented lower scores of listening habits after implantation, and 11 (38%) stated that they did not like listening to music. The findings are supported by the results of a study by Gfeller et al. (2000), in which 23% of subjects reported little satisfaction listening to music prior to or after implantation; 43% reported that the sound of music improved over time or was better than no music at all (although less pleasant than before they lost their hearing) and 23% noted that music sounded as pleasant as before hearing loss or better. In the study of Leal et al., the CI recipients were presented with musical stimuli that conformed as closely as possible to those that occur in everyday music listening situations. Eisenberg (1982) indicates that postlingually deaf adults are often disappointed when hearing music through the implant as the signal lacks the tonal/harmonic structure which hearing persons expect. Those adults have developed a concept or internal mental schemata of what music sounds like prior to losing their hearing. Their recall, however, can sometimes contribute to a highly critical assessment of sound quality, especially in cases of recent hearing loss, when the person still has a vivid recollection of sound quality. In contrast, persons who are prelingually deaf often found music to be enjoyable through the implant and identified music listening as a major motivating factor behind acceptance of the implant. In a study by Mirza et al., appreciation of music after implantation was varied but on the whole, it was disappointing, as evidenced by a questionnaire completed by 35 post-lingual adults with CI (ages 24-81 years, with a mean age of 53). Most of the subjects (54%) did not listen to music. Those who enjoyed it more after the implantation were the younger ones, who had shorter length of deafness and high speech perception scores (Mirza, Douglas, Linsey, Hildreth, & Hawthorne,

2003). Seven subjects, who played a musical instrument before becoming deaf, subsequently listened to music after implantation. Similarly, in an article by Dorman et al., a 35-year-old woman with CI who became deaf at the age of 31 (Dorman, Basham, McCandless, & Dove, 1991), expressed her high satisfaction regarding the implantation and her ability to appreciate music. She recognized familiar tunes on the radio, and continued to be a piano teacher. These findings suggest that musically trained CI recipients are better able to recognize music since they use their experience to extract maximal information from fragmentary musical evidence (Fujita & Ito, 1999).

Implant recipients rate the quality of solo musical instruments poorer than adults with NH (Gfeller et al., 1998; Gfeller & Lansing, 1991, 1992; Gfeller et al., 1997).

Gfeller et al. (2003) indicate that seldom do people hear isolated elements of music in everyday life because music is experienced as complex patterns combining pitch (melody and harmony), timbre and rhythm. In order to determine the effects of prior song familiarity and subjective complexity<sup>22</sup> on complex song appraisal, the researchers developed a test that measures appraisal of complex musical stimuli (classical music, country western and pop) of the sort heard in everyday life. Adults with CI (postlingually deafened) gave significantly less positive ratings to classical music than did adults with NH. They also rated two of three musical genres (country western and pop) as significantly more complex. The authors conclude that classical music is perceived by the implantees as more complex than the songs because subjectively it is more complex (complex rhythmic structures, more complex harmonic changes, contrapuntal organization with multiple melodic themes, etc.) even when peripheral hearing mechanism functions normally. In contrast to classical music, songs include lyrics that can be extracted by many CI recipients (not all of them) as linguistic information. Thus, it may be easier for them to follow the acoustic information. In addition, these songs had a strong, simple beat, which is effectively transmitted by implants.

Gfeller et al. (2000) indicate that mere experience with the device is not associated with improved music perception or enjoyment. Regarding music enjoyment, the researchers found significant correlations between self-report of

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<sup>22</sup> Subjective complexity: The “perceived complexity level or information content, which is mutable and a function of the listener and past musical experience” (Price, p. 186, as cited in Gfeller et al., 2003).

musical enjoyment and the amount of time devoted to music listening post-implantation.

In order to find whether different types of CI provide CI recipients with more positive or negative music listening experiences, Gfeller et al. (2000) compared four different types (Clarion, Nucleus, MED-EL and Ineraid) and concluded that none of these devices was identified with particularly positive or negative music listening experiences for any of the factors evaluated.

The present CI provides sufficient spectral cues for speech recognition perception, but it is not adequate to support music perception. This may be achieved in the future by increasing the number of functional channels and improving the encoding of the fine structure information (Kong et al., 2004).

### **2.3.3 Music rehabilitation programs for adults with CI**

The appreciation of music is the next most commonly expressed aspiration by users of CI's, following the perception of speech (Stainsby et al., as cited in Gfeller, Witt, Adamek, et al., 2002b). Therefore, aural rehabilitation for adult CI recipients who have postlingual hearing loss is a challenge. Unfortunately, hardly any music rehabilitation programs have been described in the literature for these adults.

Gfeller (2001) developed a program in which eight adults with CI received a 12-week computerized music training program (48 lessons), which consisted of pitch sequence perception, song recognition, timbre recognition and appraisal of different musical styles. Nine adults with CI served as controls. This pilot study suggested that structured listening experiences could improve music perception and enjoyment. Continuing along the same point, Gfeller, Mehr, and Witt (2001) indicate that although significant improvements in adults' music perception are evident after structured music training, everyday experiences can be beneficial. In another study (Gfeller et al., 2002b), the effect of training on timbre recognition and appraisal (i.e., the extent to which the CI user likes or appreciates the quality of sound) was evaluated. The authors state that the unique tone quality of various instruments is an important aspect of the aesthetic quality of music and obviously relates to the satisfaction of CI users. Therefore, twenty-four adults with CI were randomly assigned to a control or a training group. Twelve adults were trained for 12 weeks, four sessions per week, while the control group received no training. The training group was introduced via a laptop computer to musical instruments representing three



frequency ranges (low, medium, and high) and four instrumental families: strings, woodwinds, brass, and pitched percussion (specifically, piano). The groups presented similar response patterns prior to training, but in the post-training, the training group performed significantly better than the control group as well as demonstrating less diffuse error pattern compared to their own performance prior to the training.

In a paper based on her doctoral dissertation, Schraer-Joiner (2004), presented a case study in which she built a rehabilitation program for a 51 year-old postlingually deafened woman with CI. Rhythmic and melodic patterns were used for the pre- and post-test on the four major hierarchical levels of auditory perception: detection, discrimination, identification and comprehension (see also Amir, 1982, for these levels). All stimuli were performed live on a flute. The training also included daily listening experiences. The number of sessions as well as their duration is not detailed in this paper. Results revealed that the client demonstrated an ability to perceive the more discrete elements of rhythm, pitch, dynamics, and tempo and was also able to experience tonal stimuli and musical enjoyment. Schraer-Joiner suggests taking into consideration the following recommendations in order to maximize the training effect by-

- Introducing musical elements individually first, and combining them only when the client is comfortable and exhibits success with activities emphasizing individual musical elements;
- Introducing simple combinations of musical elements as the second step, and reinforcing especially those that involve pitch;
- Presenting shorter note durations at slower tempos and lower pitches- at softer dynamic levels;
- Increasing the number of times needed to listen to the stimuli as aural demands increase for the listener in terms of the number of elements.

The meager research and anecdotal literature cited above indeed demonstrate the importance and beneficial effects of training for these adults in terms of their life quality. However, Gfeller et al. (2002c) indicate that major changes in signal processing are still needed to achieve music perception which is equivalent to that of persons with NH. The limited number of formal studies involving musical rehabilitation programs points to the need for more research as well as formulation of

procedures and materials.

### **2.3.4 Music and children with CI**

One cannot assume that the experiences of adult implant recipients accurately represent the music experiences of children who have been implanted. The hearing history of adult and child implant recipients is very different, a fact which may affect musical enjoyment irrespective of the device itself (Gfeller et al., 1999b; Gfeller & Lansing, 1992). Much of the research regarding adult implant recipients has typically been conducted with adults who were postlingually deafened and their recollection of how music sounds prior to their hearing loss serves as an internal representation of what music sounds like (Gfeller, 2000).

In contrast, children with pre-lingual deafness have limited exposure to pitch and timbral features of music in their formative years. There may also be interesting differences among pre-lingually deafened children, who have been implanted at different ages (e.g., age three as opposed to age 10), given the importance of early stimulation in neurological development and organization (Gfeller, Witt, Spencer, Stordahl, & Tomblin, 1999). Because of this difference, Gfeller et al. (1999) investigated to what extent children and adolescents who use CI were involved in informal music activities and in formal music instruction. They also looked for the general attitude of children with CI towards music. The results indicated that a large proportion of the sample (65 children and adolescents, 59 of whom were prelingually deaf, ages 2-20.5, with a mean of 11 years 2 months,) were involved in some type of formal or informal musical activity, despite the fact that the implant was designed primarily for speech perceptions. In addition, data from the questionnaires which were completed by the parents indicated that (a) good quality sound equipment and modified listening environments can optimize musical enjoyment, (b) music intensity should be at a low to moderate level, (c) children with CI have individual preferences for different kinds of music, and (d) using visual cues or combining music with other media such as movement and art, might increase the child's understanding of music and motivate him/her to participate more fully. Stordahl (2002) states that the questionnaires provide valuable information regarding musical involvement and enjoyment of these children and adolescents, but provide little insight regarding perceptual accuracy.

In preliminary studies, Gfeller (2000) compared children with CI to those using

conventional hearing aids. The CI recipients exhibited a wider range of perception accuracy for rhythmic and melodic perception on Gordon PMMA than the hearing aids users.

Stordahl (2002) compared song recognition and song appraisal of children with CI, ages 8-15, and children with NH. The songs, well known to children in the USA, did not include words but sound only. The CI recipients (both prelingually and postlingually deafened) used rhythm as an important cue in song recognition. They performed significantly less accurately than did the children with NH. In addition, there was considerably greater variability in the scores of the children who use CI. Stordahl also describes the difference between the two groups in their test-taking behaviors: CI recipients listened to the entire test item before beginning to select an answer and did not display obvious signs of recognition. In a song appraisal task, the CI recipients demonstrated greater dislike for all items than did the children with NH. In addition, it was found that children with CI are involved in a variety of music activities. They have a greater interest in instrumental activities, compared to vocal activities. This is not surprising according to Stordahl, given the difficulty that many implant recipients report in matching one's own singing voice to an external pitch. She concludes that perhaps the social aspects of musical involvement and peer influence outweigh the negative or disappointing aspects of music listening and maybe children who have never heard music "normally" also develop a unique sense of aesthetic with regard to the beauty of music via the CI.

Following Stordahl, Vongpaisal, Trehub, Schellenberg, and Papsin (2004) examined whether 10 young CI prelingually recipients, ages 8-18, could identify familiar hit songs from commercial recordings presented with or without words. They were age matched with a control group with NH. The CI recipients succeeded to identify the songs, with or without words, from a closed set, but were less accurate than their matched peers. Most of them were unable to identify the songs from simple piano renditions of the main melody or from bass-and-drum renditions. This may be a result of the poor pitch resolution and from the absence of familiar vocal or instrumental features from the original recordings. The authors indicate that the striking lesson was that despite their music processing limitations, the participants with CI provided favorable appraisal of the limited musical information that was accessible.

Further research is needed to more thoroughly study the factors that contribute to

children with CI concerning musical involvement and enjoyment (Stordahl, 2002).

### **2.3.5 Music therapy and children with CI**

A review of the literature on this topic indicates an absence of controlled research studies on music therapy with children who use CI. However, some material has been published on the subject as shown in the following references.

In an article by Abdi, Khalessi, Khorsandi, and Gholami (2001), a music-training program was introduced as a new habilitative program, based on the Carl Orff method. The aim was to prove the feasibility of putting music to greater use for habilitation of children with cochlear implants. Effects of this program on other habilitative programs and overall hearing related skills of the children were also investigated by open questioning of the parents and the habilitation staff. All twenty-three children with CI, ages 2.5-12.5 years, showed appreciable progress in playing a musical instrument; however, this progress was not measured statistically. The effects on other habilitative processes were significant and all parents expressed their satisfaction with the program, as they perceived its benefits. Abdi et al. recommend teaching music to children who use CI, are between four and five years of age, and have had approximately four months of experience with CI. They assume that these children gain much benefit from the music training program and can be mainstreamed more rapidly and more easily, which is of great importance. They add that the psychological effects of being able to accomplish a hearing-related task can add to the self-esteem of these children and help prevent and reduce anxiety. They also emphasize: "It should be noticed that Music Training Program is not a music therapy program, it is simply adding some music related skills to the capabilities of the children in this program" (p. 112).

Gfeller (2000) suggests that in music therapy, the therapist can introduce sounds in an exploratory way, and can make adjustments in response to the child's reactions. Thus, this experience may serve as an initial step towards more complete integration. Gfeller gives a categorical list of practical suggestions, for accommodating children with CI in music therapy or music education. The reader may find some of her recommendations that were appropriate for use with the young children in this study in the Protocol for music therapy and play sessions (Appendix A). Her other recommendations relate to general communication concerns and to instructional methods.

Radbruck (2001) describes her work as a music therapist with children who were recently implanted. For these children, interaction on a verbal level was almost impossible, but via music it was easier to connect and find an appropriate level of communication. Radbruck lists the following goals in music therapy for these children. Her first goal is to awaken an interest in musical instruments and explore them as sound instruments. Further goals were:

- Focused listening to another person;
- Discovering their individual voice in a new way;
- Using music for emotional outlet;
- Promotion of musical abilities;
- And the most important goal of all is the communicative aspect.

Radbruck stresses the fact that this communication is not linked to normal speech communication and can be oriented to the age and development of these children. Acquisition of communicative skills is also fundamental for their social development. To support and stimulate communication development, she emphasizes the concept of musical activity as a playful joint activity in contrast to the more didactic exercises that these children usually receive to improve their hearing and speaking abilities. In addition, she recommends using music that is simply and clearly built. She has been doing research on this topic, trying to determine whether communicative behavior of children with CI significantly changes within 10 sessions of music therapy. Eight children out of nine, ages 3-6, presented a change regarding two modes of communication (see Stern, Jaffe, Beebe, & Bennet, 1975): “alternation” (dialogical structure) and “co-activity” (mutual experience)<sup>23</sup>. Radbruck's conclusion was that music therapy could be a useful and essential experience to these children on their way to the world of sounds and voices and to the world of verbal interaction and communication.

Koestler (2003) describes her work with preschool CI children in Norway. For her, working as a music therapist with these children presents two challenges: (a) to run regular music groups with CI children, and (b) to encourage and teach the staff

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<sup>23</sup> According to Stern et al. (1975), these two structurally different patterns of dyadic vocalizations between the mother and infant serve separate communicative functions: 'Alternation' transforms into the conversational dialogic pattern to function later in the exchange of symbolic information; 'co-action' transmits emotions during ongoing interpersonal relationship as well as contributes to relationship formation.

and the parents to use music. She claims that her music approach is interesting to these children because of the following reasons:

- There is a link between music and language.
- Music offers predictable language sequences in songs and rhymes.
- Music appeals to preschool children.
- Music offers the child a part of our culture.
- The music approach is easy to understand and pick up by staff and parents.

The key word, in her opinion, is repetition (of sounds) and therefore she recommends working with staff and parents who can facilitate the child's language development.

According to the sparse literature on this topic, more research is needed to investigate the effect of music therapy for young children with CI within the framework of a habilitation program carried out after the implantation. Such research, detailed in the next section, was the aim of this study.

## **2.4 Research questions**

The main purpose of this study, as mentioned in the section 1.4 was to study whether music therapy enhances spontaneous communicative interactions of young children with CI (two-three years of age) following cochlear implantation. In order to determine the effect of music therapy, the children's responses were compared within subjects and between two conditions: music therapy and play, the latter chosen to be the control condition. The design is described in detail in section 3.1. An additional purpose was to gather information regarding each parent's description of the child's engagement in and enjoyment of music in daily experiences before and after the music therapy intervention. The primary research question and its sub-questions as well as the additional questions relating to the parents' questionnaires and interviews are presented in the next three sub-sections. The spontaneous communicative interactions studied were imitation, initiation, synchronization and turn-taking (for definitions see section 3.6).

### **2.4.1 Primary research question (quantitative data)**

Does music therapy enhance spontaneous communicative interactions of young children, following cochlear implantation?

*Sub-question:*

Among these children, is the frequency and/or duration of spontaneous communicative interactions significantly greater in *undirected*<sup>24</sup> or *directed* music and play experiences?

#### **2.4.2 Supplementary research questions related to parent questionnaires (quantitative and qualitative data)**

How does each parent describe the child's engagement in and enjoyment of music in daily experiences before and after the music therapy intervention?

*Sub-questions:*

1. Are there significant differences between the answers of the mothers compared to those of the fathers in the pre- and post-intervention questionnaires?
2. Are there common themes in the free-text answers of the mothers compared to those of the fathers, and what is their incidence?

#### **2.4.3 Supplementary research questions related to parent interviews (qualitative data)**

What are each parent's reflections and thoughts in relation to the child's participation in music therapy after watching short video clips from the music therapy intervention?

*Sub-questions:*

1. Are there certain common themes that emerge and can be identified in the interviews held separately with mothers and fathers?
2. Are there quantitative and qualitative differences between the themes that appear in the mothers' interviews compared to the fathers' interviews?

Chapter 3 will present the design and the method of this study as well as the quantitative and qualitative data collecting procedures and analyses undertaken.

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<sup>24</sup> The undirected and directed approaches are explained in the Method chapter, section 3.7.

## Chapter 3

### Method

#### 3.1 Design

The aim of this study was to analyze communicative behavior in young children with cochlear implants through applied behavior analysis. Within the scope of research, applied behavior analysis, with its emphasis on the single subject, is defined as a “type of quantitative research used when the purpose of an investigation is to test hypotheses about the behavior of a single individual or group and examine the effect of a particular strategy on this entity; often involves comparing the various sets or subsets of data in order to identify, characterize and classify the nature of their relationship” (Wheeler, 1995, p. 549)

This study utilized mixed methods. According to Wheeler (2005, p. 14), “mixed methods research intentionally incorporates quantitative and qualitative research methods, intending to use diverse perspectives, methods, and data to generate the information that is desired”. Robson (2002) advocates using a combination of more than one method for research. Creswell and Plano Clark (2007) refer to four major types of mixed methods, one of which is the embedded experimental model, where qualitative data is embedded within an experimental design. The priority is the quantitative methodology and the qualitative is subservient. The present study was primarily quantitative (observable and measurable behaviors of the subjects and quantitative data from parent questionnaires) and was developed using a randomized A-B-A-B crossover design but incorporated techniques borrowed from qualitative research (thematic analysis of interviews) as well as case study narratives (based on material from semi-structured interviews and questionnaires), in order to provide additional relevant information to the quantitative part.

Wigram, Pederson, and Bonde (2002) indicate that single-subject design, as used in applied behavior analysis, examines the functional relationships between music therapy (or other treatment), and the particular behavior which is present in the client under investigation (p. 226). The above mentioned authors, as well as Aldridge (1996) and Wheeler (1995), relate to the fact that single-case designs may be useful for music therapists working individually (as well as for the other creative arts therapists or psychologists), particularly in clinical settings, when one cannot use



control or comparison groups due to constraints such as ethics, lack of subjects who share the same diagnosis and demographic characteristics. Aldridge (1996) writes that single case study designs are an attempt to formalize clinical stories. He stresses the importance of these designs because they allow for a close analysis of therapist-patient interaction (p. 112-113).

J. P. Gall, M. D. Gall, and Borg (1999) point out that a single-case design is favored over true experimental design or quasi-experimental design when a researcher wants to make a quantitative study of the effects of intervention on specific behaviors of individuals. This design uses “procedures to achieve tight control over the experimental situation as well as precise description of it, by frequently observing the targeted behaviors, giving sufficient detailed description of treatment to permit replication, testing reliability of observations, and replicating the treatment effects within the experiment” (p. 244). The authors note that no matter how unique the individual’s concern, a single-case design will permit investigation of the research problem. It is rigorous, time-consuming, and usually includes as much data collection as a design involving experimental and control groups. In addition, they point out that single case design allows the researcher the dual role of functioning simultaneously as both treatment provider and researcher.

In Israel, the number of young children who are deaf, have CI and meet the inclusion criteria in this study is limited. This fact made the recruitment and randomization of two comparison groups unrealistic; Therefore, repeated measures, also known as a within-subjects design (Runyon, Coleman, & Pittenger, 2000), was chosen as the most appropriate design for this small sample in order to study the effect of music therapy on spontaneous communicative interactions of these children. Hanser and Wheeler (as cited in Wheeler, 1995) indicate that the repeated measures design offers a viable alternative to randomly assigned groups.

The type of design chosen for this study was A-B-A-B, a common single case research design in which ‘A’ and ‘B’ represent two conditions: ‘A’ is a baseline, or a control condition, where the individual’s behavior is observed under normal conditions. ‘B’ is the treatment condition, where that individual’s behavior is observed under treatment conditions. In this study, condition ‘A’ was four sessions of play which included playing with different toys and games. Condition ‘B’ was four sessions of music therapy, which included exploring percussion instruments, vocal games and listening to simple songs.

The study was carried out as an in depth multiple case study, based on five subjects, comparing responses within subjects and between conditions (Barlow & Hersen, 1984; Cooper, Heron, & Heward, 1987). Play was chosen as the control condition, due to its relevance to the young age of the subjects. For a comparison of music therapy and play, the subjects were randomly assigned to receive them in either the order A, B, A, B or counterbalanced, in order B, A, B, A, to control for order effects. Subjects named Ay and Z received the order of A, B, A, B and subjects O, C, and Af– vice versa. Gall et al. (1999) explain that by returning to conditions ‘A’ and ‘B’ in turn, this design enables researchers to demonstrate that the individual’s behavior is not changing by chance but varies consistently with the presence or absence of the treatment (p. 247). It is possible to employ a crossover design when the outcome is not permanent (Richards, Taylor, Ramasamy, & Richards, 1998). Applying play and music therapy as the two conditions enabled the use of such a design because the target behaviors in this study (i.e., spontaneous communicative interactions), could be readily reversed (that is, returned to condition ‘A’ after condition ‘B’), while in many other situations, this reversal approach cannot be carried out because withdrawing a successful treatment in order to observe whether a subject returns to its pre-treatment level is not ethical. Due to the fact that the reversibility of the behavior and treatment can be met, this design is a powerful one, which documents the functional relationship between the independent and dependent variables (Richards et al., 1998).

As previously mentioned, each child received a total of eight music therapy sessions (four sessions in ‘B’ stages of the A-B-A-B or B-A-B-A design and the same number of play sessions. Based on the researcher’s clinical experience with young children who are deaf (Amir, 1982), eight sessions were deemed a reasonable period of time to see development of communicative interactions.

Each condition, either music therapy or play, consisted of four 20 minute weekly sessions. Each session, whether in play or in music therapy, consisted of 10 minutes which were directed by the therapist (therapist-led) and 10 minutes which were undirected by her (child-led) (see definitions on section 3.7). This was employed in order to assess whether a therapist-led session part vs. a child-led part would yield either more or less spontaneous communicative interactions from the children. Holck (2002, 2004) claims that a structured approach (equivalent to the directed part in this study) enables working developmentally with the child's pathology, providing new

experiences for the child and expanding it within the child's capacity for flexibility whereas an unstructured approach (equivalent to the undirected part in this study) helps working in an empathic way and building a good "commusical interplay" between the child and the therapist, which may be of paramount importance for further development of social communication.

In this study, again, the length of the session was established based on the researcher's previous clinical experience of which indicated that the children would be able to maintain their attention for this amount of time.

The first session in each stage ('A' or 'B') always started with the directed part of the session, which was, for the most part, initiated, guided and structured by the therapist. This allowed the therapist to provide these young children with supportive modeling and ease their transition from one condition to the next. To minimize order effects, subsequent sessions alternated the order of the undirected and directed parts.

Table 3.1 displays the study design by showing the number of sessions each child received and the order of directed and undirected parts in every session.

**Table 3.1. Study design<sup>a</sup>**

				<b>Subject<sup>b</sup></b>		
				<b>C, O, Af</b>	<b>Ay</b>	<b>Z<sup>c</sup></b>
<b>Session #</b>	<b>1</b>	<b>Music therapy</b>	DM→ UM	<b>Play</b>	DP→ UP	DP→ UP
	<b>2</b>		UM→ DM		UP→ DP	UP→ DP
	<b>3</b>		DM→ UM		DP→ UP	DP→ UP
	<b>4</b>		UM→ DM		UP→ DP	UP→ DP
	<b>5</b>	<b>Play</b>	DP→ UP	<b>Music therapy</b>	DM→ UM	DM→ UM
	<b>6</b>		UP→ DP		UM→ DM	UM→ DM
	<b>7</b>		DP→ UP		DM→ UM	DM→ UM
	<b>8</b>		UP→ DP		UM→ DM	UM→ DM
	<b>9</b>	<b>Music therapy</b>	DM→ UM	<b>Play</b>	DP→ UP	DP→ UP
	<b>10</b>		UM→ DM		UP→ DP	UP→ DP
	<b>11</b>		DM→ UM		DP→ UP	DP→ UP
	<b>12</b>		UM→ DM		UP→ DP	
	<b>13</b>	<b>Play</b>	DP→ UP	<b>Music therapy</b>	DM→ UM	
	<b>14</b>		UP→ DP		UM→ DM	
	<b>15</b>		DP→ UP		DM→ UM	
	<b>16</b>		UP→ DP		UM→ DM	

<sup>a</sup>DM= Music experiences directed by therapist; UM= Music experiences *not* directed by therapist; DP= Play directed by therapist; UP= Play *not* directed by therapist (see definitions on section 3.7)

<sup>b</sup>Subjects' names appear in abbreviated form. <sup>c</sup>Z completed only 11 sessions.

Establishing consistent therapeutic or play intervention procedures during the sessions was a necessary requirement for comparing results between subjects and between conditions, and/or for future replication with other samples or in other settings. Therefore, a protocol was written (Appendix A), which offers a clear procedure, accompanied by guidelines and specific techniques for use in both music therapy treatment condition and the play condition. The protocol is based on the relevant literature in music therapy and psychology as well as the researcher's clinical experience with this population. It structured the procedures for the therapist during the directed part of the sessions but at the same time was relatively flexible to be

tailored to the child's individual needs and ability. This will be further elaborated in section 3.8.2.1.1.

The researcher in this study was also the therapist in both music therapy and play conditions. In this study, the dual role was preferable to having a different person for each condition, due to the needs of the young children for permanency and predictability. In addition, the consistency within the study would benefit by neutralizing of the variance factor of personality characteristics. To further address the above mentioned issue of potential bias caused due to the therapist's intentions in her dual role, a procedure was administered to evaluate her interactions with the subjects in both conditions. This procedure is detailed in sections 3.9.1.3.1~ 3.9.1.3.2.

Some advantages and limitations of the specific design for the present study are discussed in the sections on validity and reliability (see section 3.10).

All sessions in the study were videotaped, subsequently written to DVD's and the data were analyzed (see section 3.9.2). In addition, pre- and post-intervention questionnaires and parent interviews carried out after watching short video clips from the music therapy intervention were analyzed. This will be explained in detail in sections 3.8.3.1~ 3.8.3.3.

## 3.2 Subjects

In order to be included in this study, each child and each parent had to fulfill certain criteria. Inclusion criteria for each child were as follows:

1. Age between two to three years old;
2. No known disability other than deafness;
3. Speech awareness threshold no poorer than 40 dB *with* the CI.

Regarding the second criterion, the children's educational and developmental assessments in their personal files were searched for evidence of any disability other than deafness and then considered in terms of inclusion or exclusion in the study. In addition, a screening process was carried out by the researcher to double check the information on the children: The parents completed a questionnaire called "The Infant/Toddler's Sensory Profile" (Dunn, 1997, 1999), which evaluates the child's sensory processing abilities and how these abilities support or interfere with functional performance. The sensory profiles were analyzed by the researcher (after learning how to do it from an occupational therapist). The researcher's background in

working with learning disabled children gave her additional familiarity with the area of sensory profiling. Only children, who scored within the normal range, were considered for inclusion in this study.

The importance of the third criterion lies in the fact that once the child has a speech-awareness level of 40 dB, he/she is definitely responsive to the environment.

The researcher is aware of the fact that due to the limited number of the subjects, it was impossible to control the implant manufacturer variable. Four subjects had the same type of implant and one had another type (see Table 3.2). However, as mentioned in section 2.3.2, there is currently no evidence that CI devices manufactured by different companies differ in their *music perception* outcomes.

Another uncontrolled variable due to the small sample size was the language acquisition philosophy of the settings. The children included in this investigation were drawn from educational centers which adhere to different language acquisition philosophies: oral communication (exclusively auditory-verbal), total communication (combination of verbal and signing), and cued speech (verbal with supplemental hand gestures). This will be discussed in the discussion chapter.

The inclusion criteria for each parent were as follows:

1. Normal hearing;
2. A working knowledge of Hebrew;
3. No cognitive or psychological impairments of any kind, e.g., mental retardation, alcoholism, etc.

The premise for the first inclusion criterion for the parents is that the probability of a child with CI and hearing parents to be exposed to music at home is greater than if he/she has parents who are deaf. Therefore, normal hearing for the parents was important because many questions in the questionnaires related to the music experiences at home. An additional requirement for the parents was that they have a working knowledge of Hebrew in order for them to be able to answer the questionnaires and be interviewed. Many languages other than Hebrew (e.g., Arabic and Russian), are spoken in Israel. Children with CI from non-Hebrew speaking families are treated in the educational centers for children with HI and might be potential candidates for this study. However, since the researcher does not speak and/or read those languages and therefore it would be impossible for her to analyze the parent questionnaires or interviews in those languages, parent's working

knowledge of Hebrew only was set as an inclusion criterion. This limited the number of potential subjects. In regard to the third inclusion criterion: since cognitive or psychological impairment of any kind affects all areas of the parent's as well as the child's functioning, this criterion was selected to avoid the impact of such a variable.

The information needed on the parents was provided by the principal and the psychologist of “Micha” and “Shemaya”.

Recruiting the subjects for this study was a long and difficult process, due to a number of factors. The younger the child is when implanted, the more advantage can be taken of this rapid learning stage. In general, the brain learns most quickly when it is young (see section 2.2.7). For this reason, the researcher was interested in undertaking a study with a focus on young children. At the time the elaborated proposal was submitted to Aalborg University, children in Israel were implanted at the minimum age of two years. As data accumulated that the cochlear implant was exceedingly safe and effective, the acceptable age for implantation was lowered. Currently, children as young as twelve months can be implanted. One of the inclusion criteria for the subjects was that speech awareness thresholds would be at levels no poorer than 40 dB with the CI. Following the implantation, each child reaches this level of hearing at a different time, and this can be within two months or more because of individual differences. However, in order to carry out this study and answer its questions, it was impossible to work with children who were as young as one year and a few months of age because they lacked the more developed communicative interactions investigated in this study (e.g, turn-taking and synchronization). Therefore, the researcher decided to choose children who were at least two years of age, a fact that immediately limited the number of potential subjects who matched the inclusion criteria and resulted in an arduous process of recruiting subjects in three different cities. In addition, the researcher limited herself to a maximum traveling distance of 100km to reach the different educational settings for carrying out the clinical trials. All these restrictions further complicated the recruiting process.

Ten children were referred by the staff at the different settings, as potential participants in accordance with the inclusion criteria set by the researcher. Five children were excluded from the clinical trials for the following reasons:

1. Two children did not score within the normal range on the Infant/Toddler Sensory Profile- Clinical Edition (Dunn, 1997, 1999).

2. One child dropped out after one session; another child dropped out after two sessions, both due to lack of cooperation from the parents, who had personal difficulties continuing to bring the child to the sessions.
3. The fifth child had problems with the cochlear implant after two sessions. The staff discovered that he did not hear with the implant as he should have and therefore, he was discontinued from participation in the study.

Finally, five children- four girls and one boy- participated in the clinical trials. Three girls and the boy completed all 16 sessions while one girl, Z, completed only 11 sessions due to her lack of cooperation which stemmed from a difficult phase at home and kindergarten, and some emerging resistance towards cooperating with adults.

In order to provide a more complete picture, background data on the children is presented in Table 3.2. Four children were diagnosed as having severe to profound hearing impairment by six to seven months of age; the detection of hearing impairment for one child, who is an adopted child, is not known exactly. Her parents discovered it only when she was 10 months old but they said she might have already had a hearing impairment before that. Additional information regarding each child's treatment is presented in Table 3.3.

The background data of the parents are presented in Table 3.4. The data was not obligatory, but rather optional. These data will be relevant for the discussion of parent questionnaires and interviews.



**Table 3.2. Background data of the subjects<sup>a</sup>**

	<b>Subject<sup>b</sup></b>				
	<b>C</b>	<b>Ay</b>	<b>O</b>	<b>Af</b>	<b>Z</b>
<b>Gender</b>	F	F	F	M	F
<b>Date of birth</b>	14.11.02	29.4.03	9.2.04	24.12.02	11.6.03
<b>Age at detection of hearing loss</b>	At birth	At birth	6 months	7 months	During first year of life
<b>Etiology</b>	CMV	Genetic	Unknown	Genetic	Unknown
<b>Age at implantation (in months)</b>	20	21	16	31	24
<b>Age at onset of research (in months)</b>	26	27	24	36	27
<b>Data on cochlear implant</b>	<b>Manufacturer<sup>c</sup></b>	Cochlear	Cochlear	Advanced Bionics	Cochlear
	<b>Implant</b>	Nucleus 24	Nucleus 24	HiRes 90K	Freedom contour
	<b>Speech processor</b>	Sprint	Sprint	Platinum	Freedom
	<b>Speech coding strategy</b>	ACE	ACE	HiRes	ACE

<sup>a</sup>All children were Jewish Israelis, born in Israel. <sup>b</sup>Children's names appear in abbreviated form. <sup>c</sup>All of the subjects were implanted unilaterally. None of them used a hearing aid in the non-implanted ear.

**Table 3.3. Treatment information of the subjects**

Subject	Kindergarten for children with hearing impairments			Kindergarten for children with normal hearing		
	Attendance (days/week)	Speech therapy (sessions/week)		Attendance (days/week)	Speech therapy (sessions/week)	
		Indiv.	Group		Indiv.	Group
C	-	-	-	6	7 <sup>a</sup>	3
Ay	-	-	-	6	7 <sup>a</sup>	3
O	6	3	-	-	-	-
Af	6	3	-	-	-	--
Z	6	2	-	-	-	-

<sup>a</sup>Ay and C were integrated in a nursery school for children with NH, where they received six individual sessions a week of speech and language from a teacher of the deaf. In addition, once a week Ay and C came to “Shemaya”- the nursery school for children with HI, for about 30 minutes of speech therapy from a qualified speech therapist.

**Table 3.4. Parent background data (optional for parent)**

Parent of -	Mother/ Father	Age (in years) when research started	Occupation	Education (no.of years)
C	M	40	Stay-at-home mother	12
	F	-	Yeshiva teacher	14
Ay	M	-	Kindergarten teacher assistant	-
	F	25	Yeshiva student	-
O	M	-	Kindergarten teacher	-
	F	-	Yeshiva student	-
Af	M	24	Stay-at-home mother	12
	F	28	Logistics manager	11
Z	M	-	-	-
	F	-	-	-

### **3.3 Setting**

This study was carried out in Israel at three centers with nursery schools for children with HI. Each center is located in a different city. Two of the centers belong to “Micha”- Society for Rehabilitation of Preschool Deaf Children, one in Tel-Aviv and one in Haifa. The third one, “Shemaya”, is located in B’nei Brak. Children attend “Micha” or “Shemaya” every day on a regular basis and are provided with both group and individual programs, which include auditory training, speech and language, occupational therapy and creative art therapies. “Shemaya” is open only to Jewish religious children, while “Micha” serves Jewish and Arab Israelis, religious and secular children.

In each one of these different centers, the clinical trials were conducted in a room that was assigned to the researcher by the principal of the center. The same room was used for both music therapy and play sessions except for rare unexpected changes when the session had to be held in another room. Having a permanent and consistent physical environment was important in order to create a sense of security and predictability.

These rooms were always filled with different items belonging to the center, some of which were very distracting such as mirrors or specific toys. In order to avoid subjecting the children in the study to over-stimulation and distraction, it was necessary to cover up the mirrors, hide specific toys or empty the room as much as possible before each session, and then set it up with the specific equipment necessary for either the music therapy or the play condition

At “Micha” Haifa and “Shemaya” B’nei Brak, the researcher put rugs on the floor in the room where the sessions took place. At “Micha” Tel-Aviv there was wall-to-wall carpeting so there was no need for this. Having rugs on a bare floor created a feeling of boundaries and more intimacy, especially when the room was big as was the case in B’nei Brak. Also, in the winter, it was warmer to work with the children on the rugs than on the bare floor.

### **3.4 Measurement/assessment tools**

The following measurement/assessment tools are specified below according to the order of use in this study. All assessment tools were administered in Hebrew as all the subjects were Israelis.

### **3.4.1 The Infant/Toddler Sensory Profile- Clinical Edition (Dunn, 1997, 1999)**

This sensory profile was administered to each child, as an additional screening tool for the subjects, in order to double check the information on the children taken from their personal files (see Appendix F). It is a standardized method for professionals to measure young children's sensory processing abilities and to evaluate how these abilities support or interfere with functional performance, or both. This evaluation tool is a judgment-based caregiver questionnaire, consisting of 58 items (e.g. squints in bright lights, only eats certain foods) grouped into six sections of processing: General, auditory, visual, tactile, vestibular and oral sensory processing. Each item describes infant and toddler (between birth and 36 months of age) responses to various sensory experiences and is rated on a 5-point Likert scale ranging from 'Almost Always' to 'Almost Never'. Dunn (1997) indicates in the user's manual that "the caregiver who has daily contact with the infant or toddler completes the questionnaire by reporting the frequency with which these behaviors occur (p. 1)". Caregivers report that it takes 15 minutes to complete this questionnaire. An occupational therapist or other professional then scores the responses on the questionnaire. With this information, professionals can support families by helping them understand their child's way of receiving information about the world and creating adaptive responses.

In this study, the items on the auditory processing section were not rated by the parents due to the irrelevancy of this section, which was designed for children with NH. This sensory profile has not been standardized with children who have CI. The researcher consulted expert occupational therapists who are working with children with CI in different settings in Israel, and found out that they do not have a standardized assessment tool for these children. Some find the clinical edition of this Sensory Profile to be adequate for their needs (except for the auditory processing section) and they use it regularly. In addition, the cut scores are computed for each section separately in order to see whether the child's performance in each section is a typical one or one which is considered by Dunn as 'performance at risk' Therefore, ignoring the auditory processing section does not influence the scores computed for the other sections. Another important issue is that this profile is recommended to be used only as one source of information. Dunn recommends integrating this information with other assessment data, a process which was done by the researcher, who used it in addition to the information provided by the staff. The researcher, being

aware of the standardization issue, wrote to Dunn, (2003)<sup>25</sup>, who responded as follows: “Remember, we designed these measures to provide a picture of the way ANYONE processes sensory information-it is not to diagnose a disability per se...”.

Only children, who scored within the normal range on this Profile, participated in this study, while the researcher also took into consideration the information provided on each child by the staff (Appendix G).

### 3.4.2 Parent pre- and post-intervention questionnaires

The researcher did not find any suitable questionnaire regarding music experiences of young children with CI; therefore, pre- and post-intervention questionnaires were designed to be completed separately by each parent (Appendix I & J). The purpose of the pre-intervention questionnaire was to provide information on the child’s music-related behaviors/experiences at home since the child’s CI implantation. The purpose of the post-intervention questionnaire was identical to the pre-, except that the parent had to take into account the time that had elapsed since the music therapy intervention and the play sessions.

Several *general guidelines*, recommended in the literature (Babbie, 1998; Beyth-Marom, 1986; Neuman, 2006; Robson, 2002; Sudman & Bradburn, 1983; Wigram, 2005), relate to the ways researchers may construct questionnaires. These guidelines and their incorporation into the questionnaires in this study are detailed below.

- **General questionnaire format:** The format, or the overall physical layout of a questionnaire, is considered to be just as important as the nature and wording of the questions since it can make a questionnaire easier to complete; therefore, the questionnaires in this study were written in a clear, uncluttered format.
- **Contingency questions:** Contingency questions<sup>26</sup> were used to facilitate the parents’ task in completing the questionnaires so that the parents would not be faced with trying to answer questions irrelevant to them.
- **Matrix questions:** “A matrix question is a compact way to present a series of questions using the same response categories” (Neuman, 2006, p. 295). When

<sup>25</sup> Dr. Winnie Dunn, The University of Kansas Medical Center, Kansas City, Kansas (personal communication, February 4th, 2003). E-mail: wdunn@kumc.edu

<sup>26</sup> Contingency question: A two-part question in which a respondent’s answer to a first question directs him/her to the next questionnaire item or to a more specific and related second question (Neuman, 2006, p. 286).

Likert responses categories are used, some questionnaires employ a matrix of items. Although this format has some advantages such as using space efficiently, and enabling the respondents to complete the questionnaire faster, a disadvantage is that a matrix runs the risk of fostering a response-set among some respondents. Matrix questions were not used in the questionnaires in this study.

- ***Order of items in a questionnaire:*** The order in which questionnaire items are presented can also affect responses. The researcher was aware of this issue and made every effort to arrange the questions in a way that would be both appealing to the respondents as well as provide necessary material for the researcher.
- ***Introduction and instructions:*** Where appropriate, every questionnaire should contain clear instructions and introductory comments, such as were incorporated in these questionnaires.
- ***Pre-testing the questionnaire:*** No matter how carefully one designs a data-collection instrument such as a questionnaire, there is always the possibility of making mistakes: asking an ambiguous question, one that people cannot answer, or some other violation of the guidelines just discussed. Pre-testing the questionnaire in full and/or in part with representatives of the intended population can mitigate the effects of these pitfalls. In order to assess the design and the reliability of the pre- and post-intervention questionnaires in this study, they were administered to the family of a child with CI with whom the researcher was working at “Micha” Haifa prior to the commencement of this study as a trial subject (see first version in Appendix H). The parents answered the questions and made comments and the questionnaires were revised and refined accordingly. They were then returned to the parents for final review (see Appendices I & J for final versions).

In asking questions in a questionnaire, researchers have two options: They may use open-ended questions in which case the respondent provides his/her own answer to the question, or closed-ended questions, in which the respondent is asked to select an answer from among a list provided by the researcher. Each form has advantages

and disadvantages<sup>27</sup>. A researcher's choice to use an open or closed-ended question depends on the purpose and the practical limitations of a research project. Closed-ended questions are popular since they require little time from the respondents, provide a greater uniformity of responses and are more easily processed by being transferred directly into a computer format. Open-ended responses enable freedom and spontaneity and give opportunity to probe but they must be coded before they can be processed for computer analysis. This coding process is time consuming, often requires that the researcher interpret the meaning of responses, opening the possibility of misunderstanding and researcher bias. In addition, there is a risk that some respondents will give answers that are irrelevant to the researcher's intent. Beyth-Marom (1986, p. 39) indicates that usually, people tend to give poor answers to open-ended questions, and many respondents do not reply to these questions. In this study, both types of questions were used, in order to encourage the parents to report about common music-related behaviors/experiences regarding their children as well as enable them to share other unique behaviors/experiences.

When constructing closed-ended questions, two structural requirements were recommended and followed in this study: (a) The response categories provided should be *exhaustive* by including all the possible responses that might be expected. This can be ensured by adding a category labeled "Other (Please specify: ....)", and (b) The response categories must be *mutually exclusive*, which means that they do not overlap. In an attempt to follow these requirements, the researcher carefully constructed each set of response categories. In general, the response categories or choices should be balanced. Offering equal polar opposites at each end of a continuum can do this.

In addition to the general guidelines, other *specific* recommendations related to *asking questions* were described in the above mentioned literature and were applied in this study as well:

- **Relevance of questions:** Questions should be relevant to those who are going to respond to them. The questions in the questionnaires were directed to the parents and related to their child's music-related behaviors/experiences at home; therefore, the questions were relevant and within the parents' capability.

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<sup>27</sup> The advantages and disadvantages of open-ended questions and closed-ended ones are extensively detailed in Neuman, 2006, p. 286-289.

- ***Length and clarity of items:*** Long and complicated items should be avoided. Questionnaire items were written in as clear, precise and short form as possible so that the parents did not have to cope with ambiguity, confusion and vagueness and could quickly read the item, understand its intent and easily select or provide an answer.
- ***Avoidance of double-barreled questions-*** Frequently, researchers ask respondents for a single answer to a combination of questions. As a general rule, wherever the word ‘*and*’ appears in a question or questionnaire statement, one should check whether he/she is asking a double-barreled question. Such questions were avoided in this questionnaire.
- ***Avoidance of negative items:*** The appearance of a negation (i.e., phrasing the question in a negative manner) in a questionnaire item paves the way for easy misinterpretation. This was avoided in this questionnaire.
- ***Avoidance of biased items and terms:*** The meaning of someone’s response to a question depends in large part on its wording. Questions that encourage respondents to answer in a particular way are *biased*. Words with strong emotional connotations and stands on issues linked to people with high social status can affect how respondents answer questions. Every effort was made to phrase the questions as neutrally as possible and to avoid leading questions.
- ***Avoidance of overlapping questions:*** A question that does not add information is generally unnecessary; however, some overlapping between questions is desirable and even necessary since it can serve the reliability of the measurement or its validity. In order to study the reliability of questions, sometimes one checks correlation between the answers to two questions that ask the same thing but are phrased a bit differently. When the questions are operational definitions of the same theoretical variable, it is natural that there is a partial connection between them. In such cases, the overlapping serves the aim of increasing validity. In this study, overlapping questions were not used since the questionnaires deal with facts rather than attitudes. Overlapping is more necessary in attitude questionnaires.

The questions on the questionnaires related to the following areas: the child’s responsiveness to music, the specific preferences for, or dislike of, musical sounds or



music, playing with sound games and toys, music activities or types of listening situations that enhance musical enjoyment or make music less enjoyable. Also included was a question about the parent's expectations from this study. Question two in the pre-intervention questionnaire related to whether the family had any musical instruments at home, while the same question in the post-intervention questionnaire asked whether the family had purchased a musical instrument since this research started. Questions five and six were taken from Appendix 1 of Gfeller et al., 1999b), due to its relevance to this study. Each questionnaire consisted of 13 questions. Embedded in each question was one or more of the following options:

- Ratings on a Likert scale<sup>28</sup>;
- 'Yes/No' responses;
- Free-text answers.

Table 3.5 presents the various combinations of the above mentioned options for each question.

**Table 3.5. Structure of parent pre- or post-intervention questionnaire**

Question #	Likert scale	Yes/No answer	Free-text answer
1	v		v
2	v	v	v
3		v	v
4		v	v
5		v	v
6		v	v
7	v		v
8	v		v
9	v	v	v
10	v	v	v
11		v	v
12			v
13			v

<sup>28</sup> **Likert scale:** "A scale, usually of approval or agreement, used in questionnaires. The respondent is asked to say whether, for example, they 'Strongly agree', 'Agree', 'Disagree', or 'Strongly disagree' with some statement" (Upton & Cook, 2002, p. 201).

Certain questions (questions #1, 2, 7, 8, 9 & 10) required the parents' ratings on a Likert scale. Wigram (2005) indicates that "constructing categories in the Likert scale needs careful consideration" (p. 277). There is always a dilemma of how many categories to offer to the respondents. The content of a question influences the number of possible categories (Beyth-Marom, 1986). In this study, the parent had to choose one response category among five ('Never', 'Seldom', 'Occasionally', 'Frequently' and 'Almost always' (see Appendices I & J for definitions). Five categories, which were operationally defined in the introduction to the questionnaires, seemed sufficient to the content of the above-mentioned questions. Fink (1995) also suggests a maximum of no more than five alternative responses for self-administered questionnaires.

In addition, the researcher was aware of the fact that in questionnaires which measure attitudes, respondents tend to choose the middle response category when given an odd number of categories since it is sometimes easier not to take a position and escape to the neutral middle option<sup>29</sup>. However, this study did not measure attitudes but facts, and the middle response category was not a neutral response, but rather a term that operationally defined the percentage of time the child responded in a specific manner when presented with the opportunity. Using the percentages helped focus the parent's attention on the answer and possibly lessened the tendency to use the middle category as an easy escape.

Each questionnaire was separately completed by the mother and father in order to get each one's independent perspective. The questionnaires were completed within the two weeks prior to the beginning of the clinical trials and within the two weeks after the trials were over. Another hoped-for outcome was that the information provided could serve as a catalyst for developing a set of recommendations to parents and staff regarding the ways they could stimulate the child's continuing growth in this area. In addition, gathering this information may have some clinical implications to share with the staff and parents as well as with other music therapy professionals.

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<sup>29</sup> It may be of interest to some researchers to track the number of respondents who choose this middle response category when given an odd number of categories. When using even-numbered sets, one advantage is that respondents are forced to commit themselves to either a positive or a negative position.

### 3.4.3 Session data collection form

After a survey of the literature and consultation with professionals, specific target behaviors in the area of communication were selected, and their relevance for children with HI was reviewed by experts in this area. Frequencies and durations of these target behaviors were recorded during observation of the videotapes on a coding sheet designed specifically for this purpose (Appendix E). Ridder (2007) states that video/DVD is a powerful descriptive and explanatory tool that may be used to achieve rich knowledge. She indicates that though video/DVD may be used in a manipulated way to twist the truth, it may also be used to collect data in a systematic, skeptical and ethical way, as explained by Robson (2002). He defines the three criteria as follows:

- *systematically* means giving serious thought to what you are doing, and how and why you are doing it; in particular, being explicit about the nature of observations that are made, the circumstances in which they are made and the role you take in making them.
- *skeptically* means subjecting your ideas to possible disconfirmation, and also subjecting your observations and conclusions to scrutiny (by yourself initially, then by others);
- *ethically* means that you follow a code of conduct for the research which ensures that the interest and concerns of those taking part in, or possibly affected by, the research are safeguarded ( p. 18).

### 3.4.4 Parent-Child Early Relational Assessment (Parent-Child ERA) (Clark, 1985, 1999; Clark, Musick, Stott, & Klehr, 1980; Clark, Musick, Stott, Klehr, & Cohler, 1984)

The music therapist in this study was also the researcher. To address the issue of potential bias due to the therapist's intentions in this dual role of therapist and researcher, a procedure was administered to evaluate her interactions with the subjects. Its focus was to find out whether the therapist consistently demonstrated similar affective and behavioral characteristics in UM and DM as well as in UP and DP, thus increasing internal validity. Since no assessment tool was found in the literature to assess the therapist's interactions with the child, Prof. Harel (2003)<sup>30</sup>, a

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<sup>30</sup> Prof. Judith Harel, University of Haifa, Israel (personal communication, July 13th, 2003). E-mail: jharel@psy.haifa.ac.il

clinical psychologist who is an expert in the area of parent-child interaction, recommended using an assessment called Parent-Child ERA (see also Shonkoff & Meisels, 2000, pp. 278-279). An assessment created for parent-child interactions can also be used for assessing therapist-child interactions because the therapy process is analogous to the parental process (e.g., Ogden, 2004; Slochower, 1996). The advantage of this assessment compared to other existing interaction assessments is the fact that it enables a global measurement of ongoing interaction; it is sensitive to the inter-personal dimension of the interaction, to its emotional dimension as well as to the behavioral one (Harel, 1995). This assessment was developed by Clark and designed to measure the quality of affect and behavior in parent-child interactions by using ratings on a Likert-type scale that are based on observations of 5-minute videotaped interactions, including feeding, a structured task, and free play. The purpose of this assessment was to try “to capture the child’s experience of the parent, the parent’s experience of the child, the affective and behavioral characteristics that each brings to the interaction, and the quality or tone of the relationship” (Clark, 1999, p. 822). The revised instrument (Clark, 1985) includes a total of 65 individual variables composed of 29 parental, 28 child, and 8 dyadic items. It measures therapeutic change and differences in quality of interaction by not only looking at concrete and discrete behaviors but also by organizing and synthesizing a large number of cues to a more abstract construct. The ERA was adjusted by Harel (1995) to 26 variables only. In Harel’s doctoral thesis, she reported that 15 items were chosen to describe the mother’s behavior, and 11 items for the child’s behavior. The 15 items aggregated in two scales: (a) affect, and (b) sensitive responsiveness to child. For the present study, the therapist’s interactions with each child were assessed by using only 14 variables out of the 15. These items are detailed in Appendix K. The item of ‘negative mirroring’, which was added by Harel in her thesis, was never observed in this study for any of the children; therefore, Harel recommended excluding it from the analysis. This could be done because as missing data for all children, it did not affect the internal consistency Harel found for those scales<sup>31</sup>.

The usefulness of this assessment in this study will be reviewed in the discussion chapter.

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<sup>31</sup> For children who were 20 months of age, Cronbach’s alpha for the two scales which described the mother’s behavior was: Affect: .75; Sensitive responsiveness: .91.

### **3.4.5 A semi-structured parent interview**

In the present study, the parent interviews were not the main focus, but rather complementary data. The purpose of the interview was to give each parent an opportunity to reflect on what he/she saw and felt in relation to the child's participation in music therapy; therefore, a semi-structured interview was chosen (Appendix L1, L2.), rather than a structured or an unstructured (in-depth) interview. This point will be explained in detail below.

Wheeler (2005) and Robson (2002) indicate that for this type of interview the researcher prepares a list of questions that can be asked later during the interview. The phrasing is flexible and adapted to suit the interviewee. During the interview, the interviewer may modify the order of the questions, change the wording, give explanations or ask for further details and feelings concerning the experience in order to allow the fullest description of it to emerge. Compared to the structured interview, this type of interview has the following principal advantages (based on: Arksey & Knight, 1999; Berg, 2007, pp. 92-97; Gray, 2004, pp.213-237; the National Distance Education Center of Ireland [Oscail], n.d.):

- It has the potential of providing richer material.
- It is more flexible and enables the interviewer to expand and deepen the dialogue by raising more questions about the different experiences of the interviewee. While the original script of the interview guarantees the uniformity of topics across the interviewees, each particular interview is unique due to the new questions elicited by the answers given by the interviewee.
- The level of language may be adjusted and questions may be reordered during the interview.
- The interviewer may add or delete probes to interview between subsequent subjects.

The disadvantages are as follows:

- It takes longer to carry it out.
- Summarizing the data and analyzing them is much more time-consuming.
- Analyzing the data is more difficult.
- It reduces the control the interviewer has over the situation, especially when

the interviewer is less experienced in carrying out this type of interview.

- It may run the risk of losing information that the researcher has not thought about before or focusing on specific aspects to the neglect of others.
- It is necessary to provide some training for the interviewer in order to avoid the following possible effects in the interview: (a) suggestions that might influence answers, or (b) refraining from asking enough questions due to concern about tiring the interviewee.
- Hard to achieve reliable analysis of open-ended responses.

Despite the disadvantages, the semi-structured interview seemed the most adequate tool to capture the parent's experience, due to its advantages as stated above and its suitability to the purpose of this study. The unstructured (in-depth) interview was not appropriate for the purpose of the interviews, since it was not the main focus, as previously mentioned. In addition, such an interview includes an enormous amount of material, takes a long time to carry out, and its analysis is much more time-consuming.

The interview, consisting of nine pre-defined questions (Appendix L- L1, L2), was preceded by watching ten minutes of systematically selected short video clips from the music therapy sessions. Mothers and fathers were interviewed separately by a clinical social worker, after the clinical trials were completed. An additional benefit of such an interview, which related to the child's participation, was to give the parent a sense of importance and a feeling of respect for his/her opinions. This was especially so for the parents who did not attend the sessions. The interview also served to point out to the parents that the child's behavior during the sessions and some of the child's behavior at home might be related. Clark et al. (1984) indicate that objective assessments often fail to answer questions about what the parent is experiencing with the child; the interview allowed the parent to share some feelings and thoughts with the interviewer.

C's, Ay's and Z's mothers attended all sessions, except when unusual circumstances prevented them. Z's mother only attended 11 sessions and declined to be interviewed. C's and Ay's mother were the only ones who were asked one of the nine pre-defined questions that related to the comparison between their experiences during the sessions with what they were experiencing while watching the video

segments (see Appendix L1 or L2 for question #8).

### **3.5 Equipment/material**

During the course of the research period, each condition- the music therapy sessions and the play sessions - had its own set of equipment. The same equipment was used consistently throughout the research period. This ensured three important elements in this study:

- Object permanence for the children;
- The possibility of future replication by other researchers;
- Neutralization of novelty effect.

The room where the sessions took place was set up in the same way every week.

As previously mentioned in section 3.3, at “Micha” Haifa and “Shemaya” B’nei B’rak, the researcher put rugs on the floor in the room where the sessions took place, and the equipment for both conditions was displayed on the rugs, available to the child. At “Micha” Tel-Aviv there was wall-to-wall carpeting on which the equipment was placed.

To signal the commencement of each session, either music therapy or play, as well as the transition from UM to DM (or vice versa) or from UP to DP (or vice versa) (see section 3.1), the researcher used a digital kitchen timer with low volume and high pitched sound. The timer was important for the video analysis as well, because it signaled exactly when the session began and when each session part (undirected and directed) of the session ended and/or began.

#### **3.5.1 Equipment/material for music therapy**

The musical instruments were chosen based on the meager literature found by the researcher on this topic as well as on her clinical experience with this population. In their comprehensive resource manual and curriculum guide on music therapy with children with HI, Robbins and Robbins (1980) claim that most of the instruments normally available for children with NH can be used successfully with children with HI. Those that are unsuitable are either too high in pitch and/or too soft. They indicate that “the hearing impaired child’s perception of musical sounds will be limited or distorted to an individual extent. It follows that the “better” the sound quality of the

music the child is listening to, the greater possibility he has of receiving attractive, engaging sound impressions” (p. 93). They claim that together with the quality and characteristics of the music, the timbre of the instrument is a vital factor in determining the significance of the child’s experience and the extent of any resulting growth of auditory capability. Therefore, they point out that it is of great importance to use instruments that produce clear, distinctive, interesting and enjoyable sounds. Their suggestions are based on their extensive experience and supported by audiological investigations (Robbins & Robbins, 1980).

As mentioned in section 2.3.1, no specific recommendations were found in the literature regarding choice of instruments for children with HI<sup>32</sup>. For children with CI, the only recommendation was the one made by Gfeller, that is to determine individual preferences for particular musical instruments (Gfeller, 2000, p.128).

Guidelines for choosing the musical instruments in this study were as follows:

1. To expose these children to musical instruments that produce a variety of sounds that motivate them to explore each instrument and choose *the instrument* they prefer and *the way* they would like to play it;
2. To provide musical instruments with a good sound quality;
3. To suit the instruments to the children’s developmental stage. Children gain control over whole-arm movements before they gain control over its parts. Following are some examples of instruments that offer these young children easy sound production and the various motoric movements required to produce the sounds, e.g., beating the cymbal or the bongos with different mallets or hands, shaking the bells, playing on the electronic keyboard with their fingers, hands, or even their feet; playing the handle castanets by shaking them in the air or holding the handle in one hand, and beating the castanets on the other palm; shaking the tambourine or beating it with a mallet while it is on the floor or other flat surface;
4. To purposely present some of the instruments in pairs, e.g., the castanets, the mallets, the tambourines, and the set of bongos (which consists of two drums that are attached to one another) to enable communicative interactions by using the same instrument (or playing the same instruments with the same type of

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<sup>32</sup> Since 1991 (Darrow's article on preferences for timbre and musical instruments), no literature has been written on this topic. Prof. Alice-Ann Darrow, Florida State University (personal communication, September 15th, 2008). E-mail: aadarrow@fsu.edu



mallets), and thus, not overwhelming these children with different instrumental timbres.

The following instruments and other equipment and material were used in the sessions:

1. Electronic keyboard, four octaves, (Yamaha Portasound PSS-290). All buttons, with the exception of those needed for volume and power, were covered with a piece of foam sheet, to avoid distraction;
2. One set of bongos (Toca manufactured), head size: 20 cm & 25 cm, 8 lugs, 19 cm height;
3. A cymbal, silver-bronze, 40 cm diameter, on a cymbal stand, height adjustable.
4. Two headless tambourines with the handles built into the frame:
  - (a) 25 cm diameter, a plastic frame with two rows of seven pairs of jingles in each row;
  - (b) Half moon tambourine, a plastic frame with two rows of eight pairs of jingles in each row;
5. Two handle castanets;
6. Two sets of sleigh bells on plastic handles; three bells in a set; one bell is larger than the other two;
7. Two pairs of mallets:
  - (a) 25 cm long, hard felt-heads and a plastic handle (made for metalophones)
  - (b) 30 cm long felt ring head, diameter 50 mm, ring thickness 40 mm, wooden handle (Heavier heads produce louder sounds. (Harder heads produce sharper and louder sounds and generate more overtones);
8. A portable CD player;
9. A CD with three recorded songs (Appendix N);
10. A binder with three pictures associated with the recorded songs (Appendix O).

The instruments used in the present study were, for the most part, those recommended by Robbins and Robbins (1980). The sleigh bells, though not on the Robbins and Robbins list, were included because of the researcher's personal experience (Amir, 1982) with them while working with young children with HI. A spectral analysis (Amir, 1982, p. 115) confirmed that these specific bells have a wide

frequency range (from 20 to 6000 Hz), further increasing the probability that the sound would fall within the audible range of the children in this study.

The CD with the three recorded songs was prepared by recording the researcher singing on the computer and burning it onto a CD. This was preferable to preparing a cassette tape because it was easier for the researcher to find a specific song on the CD than struggling to find the right place on the cassette tape and thus risk losing the child's interest and focus.

The rationale for this activity of listening to unaccompanied recorded songs as well as other music experiences is detailed in Appendix A.

### **3.5.2 Toys/games for play sessions**

The toys and games for the play sessions were carefully chosen after searching the literature (Casey, 2005; Hughes, 1991; Oesterreich, 2002; Riddick, 1982) for toys and games that are developmentally appropriate for this age group (two to three years of age). In addition, the researcher consulted the kindergarten teachers who worked with the children for recommendations. Some considerations that were taken when choosing the toys and games for this study were:

- Safety: An issue of paramount importance: Toys should have no sharp points or rough edges, and should be nontoxic and too large to be swallowed. Fabric toys should be labeled as nonflammable or flame-retardant. There should be no strings or cords that could wrap around a young child's neck.
- Durability: The toys' durability and their parts should be appropriate in relation to the child's size and strength. They should be sturdy and not splinter or break with normal use.
- Cleanness: Preference should be given to toys which can be easily washed and cleaned.
- Stimulation, curiosity and multi-purposeness: The toys/games should stimulate the child's interest and evoke curiosity. Some toys should provide the child with opportunities to play with them creatively in a variety of ways rather than only one definitive way.
- Usable: It's important that the child be able to effectively manipulate the toy as independently as possible with minimum help from an adult to avoid undue frustration.

In order to create a clear difference between the music therapy intervention and the play sessions, and to avoid contamination of the results, no sound-making or musical games or toys were included. For this young age group, consistency and object permanence are key factors. Therefore, the selected toys and games, listed below, were always available to the children during every play session:

1. A plastic bucket with “Duplo” blocks and dolls (two ‘windows’, a baby, a girl, a boy, a man, a woman, a dog, two mini-carts);
2. Plastic kitchen dishes (a plate, a pot with a lid, a cup, a fork, a spoon and a knife);
3. Plastic food (a cookie, a croissant, a bun, and some fruits: a peach, a pear, a lemon, a banana);
4. A small plastic bottle with ‘milk’ that disappears when it is turned upside down and re-appears when it is turned the other way around, as if the bottle is filled up with milk again;
5. A doll which consists of three dolls in one: “Little red riding hood”, the wolf, and the grandmother;
6. Two small furry blankets;
7. A small pillow;
8. A wooden in-set puzzle, which includes five human figures and four cars.

### **3.5.3 Recording equipment**

#### **3.5.3.1 Video equipment**

All sessions were recorded by using two video cameras (on two tripods). The cameras were placed in the room so that the angle between them was 90° and a wide lens was assembled on each of them, to ensure widest possible coverage of activity within the room. Due to the fact that the research was carried out in three different settings, it was impossible to use permanent hidden recording equipment to prevent the children’s distraction, but it seemed that the children adjusted immediately to the presence of the cameras, and were perhaps too young to have an understanding of what they were, or their purpose. Sometimes, when the light in the room seemed insufficient for getting a clear enough picture, the researcher used a 500 Watt projector. The projector was placed on the floor and connected by a long electrical cord that could be plugged into different outlets in the room. This enabled the researcher to place the projector closer to where the session was taking place, but far

enough from the children to be able to move around without getting burned from the heat of the bulb. The projector was directed to the ceiling, so that the returning light from the white ceiling would provide more light and thus result in better quality video material.

During the first few months, the researcher used two video cameras: (a) Samsung VP-L630 PAL Hi 8 (b) Mini DV Cannon MV700. The Samsung video camera is an analogical one and as such, produces lesser quality video material. Therefore, after a few months, another mini DV video camera- Panasonic NV-GS250 was purchased. This camera also allowed for faster and easier downloading of the video material to the computer.

All video material was downloaded from the video cameras to the computer by using the computer software WinDVD Creator 2, and then, burned to DVD's. Prior to doing the video analysis, the researcher watched the DVD's and selected the best quality material from the cameras. The video analysis was subsequently carried out by using the computer software ASUS DVD XP (ASUSTek Computer Inc., 2002)

### **3.5.3.2 Audio equipment**

The parent interviews were recorded by using a Sony Cassette-Corder TCM-200DV. The main advantage of this cassette recorder is the fact that it can double the recording time without the need to turn the cassette over; thus, if the interview lasts more time than a typical cassette (30 or 45 minutes per side), the interviewer can continue the interview without any interruptions.

## **3.6 Target behaviors (dependent variables)**

As mentioned in section 3.4.3, specific target behaviors in the area of communication were selected, and their relevance for children with HI reviewed by experts in this area. The target behaviors (dependent variables) were four *spontaneous* communicative interactions demonstrated by the children: Imitation, initiation, turn-taking and synchronization. As detailed in section 2.2, communicative interactions are important for normal communication as they serve as prerequisites to developing and mastering language (e.g., Chiswanda, 1997; Whetherby & Prizant, 1992; Yoder & Warren, 1993).

Wheeler (2005) stresses the importance of a good operational definition in order to increase inter-observer and intra-observer reliability when using any observational

method. Operational definitions of the target behaviors for observing the video material as well as analyzing it were as follows:

- **Spontaneous imitation:** Spontaneous reproduction, echo, or attempt to imitate music therapist's action made by the child within 10 seconds or less from the event the child is imitating;
- **Spontaneous initiation:** A communicative act (verbal, vocal, instrumental, gesture<sup>33</sup>, etc.) demonstrated spontaneously by the child with the apparent intention of initiating an interaction with the music therapist;
- **Spontaneous turn-taking:** The child spontaneously initiates an act (verbal, vocal, instrumental, gesture, etc.), then waits or listens for a response from the music therapist. This procedure is repeated twice. These four steps will be considered as one event of turn-taking;
- **Spontaneous synchronization:** The child matches<sup>34</sup> the music therapist's action spontaneously and simultaneously (rather than successively).

For spontaneous imitation and initiation, only frequency scores were collected for analysis, while for turn-taking and synchronization both frequency and duration scores were collected. The number of events for turn-taking was scored as well.

These spontaneous communicative interactions are further elaborated in Appendix P on coding guidelines.

In addition, to illustrate these communicative interactions, video examples of them are presented in the DVD accompanying this thesis. Prior to watching this DVD, it is recommended that the reader refer to Appendix Q.

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<sup>33</sup> Iverson and Thal (1998) define gestures as actions produced with the intention to communicate and typically involve fingers, hands, and arms and also may employ facial features (e.g., lip smacking for 'cookies') or even the entire body (e.g., bouncing up and down for 'horse') (see pp. 59-60).

<sup>34</sup> Matching: (a) In music therapy: "Improvising music that is compatible, matches or fits in with the client's style of playing while maintaining the same tempo, dynamics, texture, quality and complexity of other musical elements." To achieve a 'match' in musical terms means that the therapist's music is not identical to the client's, but is the same in style and quality. Therefore the client experiences that the therapist's music 'fits together and matches' his or her own production "(Wigram, 2004, p. 84). (b) In play: Playing in a way that is compatible, matches or fits in with the client's style of playing while maintaining the same dynamics, quality and complexity presented by the client in their play. To achieve a 'match' in keeping with the above definition of musical terms means that the therapist's play is not identical to the client's, but is the same in style and quality. Therefore the client experiences that the therapist's play response 'fits together and matches' his or her own playing style (PhD course, Aalborg University, November 2006).

### **3.7 Independent variables: *condition* (music therapy vs. play) and *session part* (directed vs. undirected)**

Each child in this study received music therapy as well as play sessions, as described in section 3.1. Music therapy consisted of music experiences such as exploring simple percussion instruments by practicing different musical parameters (e.g., loud/soft, fast/slow), playing a song game or a vocally based rhythm game, and free vocalizing. The play sessions served as a control condition, to compare with the music therapy sessions and included playing with different toys and games. Each 20 minute session, either play or music therapy, was carried out once a week. A weekly session was the only manageable solution to coordinating the respective schedules of the researcher, the parents and the staff (see a detailed explanation on section 3.8.2). The session consisted of two distinctive parts of 10 minutes each, one part directed by the therapist and one part not directed by her. These two session parts in music therapy and play will be now operationally defined to clarify the differences between them:

**Music experience directed by therapist (DM):** The music experience, in which the music therapist and child engage in music activities predominately initiated, guided, structured and encouraged by the therapist.

**Music experience not directed by therapist (UM):** The music experience in which music therapist and child spontaneously engage in music activities predominately initiated and structured by the child.

**Play directed by therapist (DP):** Play activities in which music therapist and child engage in games or playing with toys, predominately initiated, guided, structured and encouraged by the therapist.

**Play not directed by therapist (UP):** Play activities in which music therapist and child spontaneously play with games and toys which are predominately initiated and structured by the child.

In the undirected part of the session, whether music therapy or play, the therapist responded to child-led activities, using imitation, turn-taking and matching to support the child's initiatives. The child may spontaneously build a structure, or begin to organize the activity when seeing the therapist's preparedness to respond to his/her ideas or initiatives.

Directed music experiences included exploring percussion instruments through the practice of different musical parameters (e.g., loud/soft, fast/slow), listening to

recorded songs, and a vocally based rhythm game. Undirected music experiences could include the same experiences if the child initiated those experiences.

Directed play experiences included exploring different toys and games by practicing motoric and cognitive functions such as building with Duplo blocks, preparing a meal, feeding a doll with a ‘bottle’ of milk, playing with an in-set puzzle, etc. As with music therapy, undirected play experiences could include the same experiences if the child initiated those experiences.

The different experiences in play and music therapy are further detailed in Appendix A. In addition, to illustrate these two session parts, video examples are presented in the DVD enclosed to this dissertation. The reader is recommended to refer to Appendix Q prior to watching the DVD.

### **3.8 Procedure**

The field work in this study can be divided into three phases:

1. Phase I: Pre-intervention procedures;
2. Phase II: Research intervention;
3. Phase III: Post-intervention procedures.

#### **3.8.1 Phase I: Pre-intervention procedures**

The first phase of the pre-intervention procedures included:

1. Recruiting subjects and the signing of parental consent forms;
2. Familiarization sessions of researcher with the subjects;
3. Completing pre-intervention questionnaire.

These steps will be now described in detail.

##### **3.8.1.1 Recruiting subjects**

The process of recruiting the subjects took place in two stages:

1. Young deaf children with CI and their parents were referred by the staff of the three educational settings (section 3.3) according to the inclusion criteria set by the researcher (section 3.2). At this stage, the researcher had met with the parents and explained the goal of the study, procedures, possible benefits for the child, as well as ethics and confidentiality. The parents were also given a detailed information sheet (Appendix B).

2. Parents who expressed their interest in the study were first asked to complete a questionnaire called “The Infant/Toddler’s Sensory Profile” (Dunn, 1997; see Appendix F). This was introduced as an additional step in the screening process (section 3.3.2), before the trials began because the staff in the different settings expressed their strong interest and eagerness to include as many children as possible in this study. Therefore, when referring a child as a potential candidate, they sometimes tended to minimize the information in the personal file of any child with certain problems that might make him/her ineligible for acceptance into the study. Due to the fact that the mothers had more daily contact with their children than the fathers, they were better able to answer the questions and they were the ones who actually completed the questionnaire. They completed the questionnaire within a week. The researcher scored the responses on the questionnaire and only children who scored within the normal range participated in this study (Appendix G). The parents of the suitable children indicated their willingness to participate in the study by signing consent forms (Appendix C). Four families signed the video consent forms as well. One family signed the video consent form only partially. They did not agree to have the video material used for teaching and lecturing purposes or for research publications, but solely for analyzing the data.

The field work lasted more than 1.5 years. The reason for this was that only at “Micha” Tel Aviv could the researcher work with two children during the same period of time and on the same day. This was not the case with the two children at “Shemaya” in B’nei B’rak and the child at “Micha” Haifa, due to the fact that each of the three children in the above named pre-schools started the trials at a different point of time, when their hearing level reached the prerequisite of 40 dB with the CI.

### **3.8.1.2 Familiarization sessions**

Due to the young age of the children (two-three years of age), it was necessary to develop trust and security with them before the commencement of the study. Thus, the research trials were preceded by a familiarization stage of two sessions- one session a week. It was limited to two sessions to avoid working into a developing relationship, a fact that could affect the study results. There was a dilemma whether to



hold the familiarization sessions at home or at the children's nursery schools where they were treated. After a discussion with the principals of the different nursery schools, it was decided to hold these sessions at the nursery school due to a host of issues related to the families.

The researcher attended the nursery school for each hour-long session during the free play time of the children. Her approach was neutral, without promoting any communication but rather 'being together' and establishing herself as a non-threatening person for the child.

### **3.8.1.3 Pre-intervention questionnaire**

The last stage prior to beginning of the research clinical trials was the pre-intervention questionnaire. As previously mentioned (section 3.4.2), the purpose of this questionnaire was to provide some information regarding the child's music-related behaviors/experiences at home since the child was implanted.

There are four common options to administer a questionnaire: (1) sending it to the respondent and receiving it back by post/mail, (2) by phone, (3) completing it individually in a group, in the presence of the researcher or his/her representative, and (4) completing it face-to-face. Obviously, each has advantages and disadvantages. Option #2 was rejected since it did not enable the relaxed time needed to complete the questionnaire. In addition, expressing oneself through the written word is a different experience than using the spoken word. Although responding in writing usually takes longer than doing it by phone, it allows the parent to find a familiar, comfortable atmosphere in which to think and write. It also requires the respondent to feel more obligated regarding the words he/she puts down on paper, than when responding quickly on the phone. The phone can often evoke stress both in regard to expressing oneself and in the lack of privacy a parent might be experiencing at home. Since parents, particularly those with many children as two families in this study, often have a hectic life, completing the questionnaire on their own within the span of two weeks, enabled the parents to choose when to do it and how much at a time. Option #3 was unrealistic, due to technical difficulties concerned with having the parents meet at a specific time and on a specific date. The last option- completing the questionnaires face-to-face (option #4) seemed too time consuming and costly. The preferred way in this study was similar to option #1, but instead of sending it by post/mail, the researcher gave the questionnaires to the parents by hand, since she met them in the

educational settings where the children were treated. The researcher explained the procedure and all the relevant information to the parents. This information was written in the questionnaire as well. The parents were asked to take the questionnaire home and complete it to the best of their ability. They were invited to call the researcher if they found any of the questions unclear.

The advantages of the way the questionnaires were administered are as follows:

- Saving time and money;
- Avoiding personal bias which results from the relationship between the researcher and the respondent during the process of completing the questionnaire, i.e., the respondent does not necessarily feel either the necessity to respond to the interviewer's expectations or to make an impression on him/her.

Regarding the disadvantages-

- The respondent may not fully understand some of the questions although they were phrased as clearly as possible as well as pre-tested.
- In the absence of the interviewer, the respondent may read all the questions before answering the whole questionnaire and thus, the order planned by the interviewer loses its impact.
- Lack of relationship between the respondent and the interviewer may lessen the respondent's willingness to answer the questionnaire as precisely and deeply as possible, especially in regards to questions which require more thought. Such relationship, which is built in a face-to-face administration of the questionnaire, results from the interviewer's characteristics which may affect the interviewee, such as his/her behavior, appearance, tone of voice, social status, motives, maturity, intelligence, attitudes and expectations (Beyth-Marom, 1986).

Each questionnaire was separately completed by the mother and father in order to get each one's independent perspective. The questionnaires were completed within two weeks prior to the beginning of the study (Appendix I- I1, I2).

### **3.8.2 Phase II: Research intervention**

The second phase was the clinical trials. This phase started with each child at a

different point of time, depending on when he/she reached the inclusion criteria of a 40 dB hearing level with the CI. Once the child has a sound awareness level of 40dB, he/she is definitely responsive to the environment<sup>35</sup>. Information on the child's readiness was provided to the researcher by the speech therapist or the audiologist who worked with the child. Reaching this hearing level is individual and can take between two months or more after the implant surgery. This time span ensures that the audiologist has had the opportunity to see the child for three or four MAPPING sessions, during which the external sound processor is individually programmed.

Each child received a total of eight music therapy sessions and eight play sessions in the order explained previously in section 3.1. To maintain consistent and systematic procedures within the music therapy and play sessions for each child, the researcher created and used a flexible protocol. A short description of these procedures will be offered below and further elaborated in Appendix A.

The researcher's original intention was that all mothers would attend the sessions, in light of the children's young age. Three mothers attended all sessions except in the case of unusual circumstances for which another adult family member replaced the mother. However, in Tel Aviv, due to the mothers' daily scheduling problems, it was not feasible for them to attend. Therefore, another adult with whom the child was familiar from the nursery school accepted this responsibility. The mother or the other adult was asked to remain seated quietly in the corner of the room throughout the sessions. The role of the mother or her substitute was to be emotionally available for the child, if needed. They were also instructed that if the child approaches them and gives them a toy/instrument, they should take it but give it back immediately and encourage the child to return to the area where the session is taking place.

The music therapy and the play sessions were carried out on a weekly basis. This decision came about as a result of the following considerations:

- The researcher's scheduling problems arising from her other professional commitments;
- The inability of the mothers to attend the sessions more than once a week;

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<sup>35</sup> The MAP fine-tuning is an ongoing process that may take months or years, depending on the skill of the audiologist, the cooperation of the child and the amount of preliminary electrophysiological data.

- The limited availability of a permanent room for the sessions, in each of the different settings.

All sessions were video taped by using two video cameras as described in section 3.5.3.1. Although the children were aware of the cameras, they did not seem to be inhibited by them. The video material was downloaded from the video cameras to the computer and burned to DVD's. The data collection and analyses undertaken will be detailed in section 3.9.

### **3.8.2.1 Design of research clinical trials**

As previously mentioned (section 3.1), each child received a total of eight music therapy sessions (four sessions in both 'B' stages of the A-B-A-B or B-A-B-A design) and the same number of play sessions with a corresponding pattern of presentation. In order to compare results between subjects and between conditions, as well as for future replication with other samples or in other settings, it was necessary to establish consistent and systematic procedures during the sessions. Therefore, a protocol was written, which offered a clear procedure, accompanied by guidelines and specific techniques for use in both music therapy and play. The protocol offered structured procedures for the therapist during the directed part of the sessions but at the same time was relatively flexible to adapt to the child's individual needs and ability.

#### **3.8.2.1.1 General principles and procedures**

As mentioned in section 3.9.2.1, the researcher wrote a flexible protocol for the music therapy and the play sessions. This protocol is presented in detail in Appendix A. Wigram (2007) states that "studies where music therapy is being compared with a placebo intervention can particularly benefit from a structured procedure that is consistent enough to be reliable, but flexible enough to allow the clinician researcher to respond to the client's evident therapeutic needs, rather than the client being required to respond to the procedure" (p. 91).

This section will present only a brief outline of the general procedures and principles that were common to both music therapy and play sessions<sup>36</sup>:

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<sup>36</sup> The reader may refer to section 3.1 for the different reasons for a specific procedure administered during the research trials.

- The sessions<sup>37</sup> were implemented once a week, usually on the same day and at the same time during the morning, except in the case of unusual circumstances.
- The researcher was also the therapist (reasons for this dual role appear in section 3.1).
- Each session lasted for 20 minutes and was divided into two parts: ten minutes of a directed part, which was therapist-led (i.e., initiated, guided, and structured by the therapist), and ten minutes of an undirected part, which was child-led (definitions of these two parts were given in section 3.7).
- The point of moving from the directed part of a session to the undirected one (or vice versa) was signaled by a digital timer.
- Each session took place in the same room, except in the case of unusual circumstances.
- The first session in each stage (music therapy or play) always began with the directed part, in order to provide these young children with supportive modeling and ease their transition from one condition to the next. To minimize order effects, subsequent sessions alternated the order of the undirected and directed parts.
- The number and variety of objects that could be utilized for expression, play and manipulation was similar in the music therapy condition and the play condition.
- The same musical instruments or toys and games were used in the directed part of the session as in the undirected part.
- To prevent novelty effect during the research trials, no new musical instruments or new toys and games were introduced to the child besides those that had been presented in the first session. No sound games/toys were available to the child during the play sessions.
- Every session always opened with a greeting ritual ('hello' song in music therapy; verbal greeting, in play), and closed with a good-bye ritual (a good-bye song in music therapy; verbal good-bye in play).

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<sup>37</sup> The word 'session' throughout this section will refer to either a music therapy session or a play session.

- Mother attendance during all sessions was recommended if possible.
- All sessions were video taped by two video cameras.

The above procedures and principles provided these young children with the permanency and predictability that are necessary for developing feelings of security.

There are some commonalities of the music therapy and the play condition in this study with the speech and language approaches mentioned in section 2.1.2.4. During the music and play activities the therapist used only oral communication. Neither signs nor lip-reading cues were added. The sentences in both conditions were short and simple, and appropriate to the developmental hearing stage of the children. Sometimes the therapist repeated the sounds, words, or the short sentences, as with the oral approach. Two of the songs sung in the music therapy sessions included the word for the object itself and sounds that were associated with them, and one song was only the sound itself-“la la la”- to demonstrate the girl’s singing (see Appendix N). This is in keeping with the recommended list of sounds suggested by the auditory-verbal approach (Sternberg, 1998), where in the first stage, each word for each object is accompanied with its sounds i.e., a cow- moo, a cat- meow. The different sounds in the list include extensive acoustic information, which is rich in its contrasts. Thus, it is easier for the children to discriminate between the sounds and to be able to say them out loud, rather than saying the words themselves.

In the natural language acquisition program (Dromi & Ringwald-Frimerman, 1996), based on normal developmental processes in language acquisition and developing communication as the main goal in the interventions, some general interventions are suggested as well as more specific ones, for example those which are within the dialogue level. These are consistently implemented during the speech and language sessions. Some of the more general ones which were also implemented in the music therapy and play session in this study are:

- Response to child’s initiations and encouraging him/her to respond (the latter obviously could not be applied in the undirected (child-led) part of the session);
- Mediating: Acts done by the therapist in order to interpret the environment for the child and enable him/her to create more meaningful relations with people and objects in the environment. This can be done by demonstrating, giving

cues (by pointing, gestures, verbalization, presenting an object, etc.), questioning, and explaining;

- Observation: Observing the child enables the therapist to identify the child's areas of interest, his/her communicative intentions and the ways used to express them, and his/her relations with objects in the environment as well as spontaneous activity with these objects without the therapist's support. Observation enables setting goals and ideas in regards to the interventions needed.

Interventions within the dialogue level:

- Interpreting the child's communicative intentions: The therapist talks instead of the child, e. g., The child looks at a house that he/she built out of Duplo blocks and knocked it down, laughs, and the therapist says: Oye, the house was knocked down. Are you happy?
- Expanding, e.g., the child says 'ah', points to a ball and the therapist says- A ball? Is it a ball? Would you like the ball?
- Different types of imitation made by the child (see section 2.2.4.1); In addition to these, the therapist may repeat the child's vocalizations/verbalizations and later- repeat the sound/word in the correct way.
- Encouraging the child to speak: The therapist may point to an object and starts to say the first syllable of a word that is easy to produce and waits for the child to complete it.
- Verbal description, e.g., the child 'cuts' a plastic orange and the therapist says: It is an orange. You cut the orange.
- Waiting time- Timing is of paramount importance during communication with the child, e.g., the therapist directs the child's attention to an object in the room, waits until the child terminates looking at the object and only when the child looks again into the therapist's eyes, the therapist asks /says something about this object.

The speech and language approaches, as with every other intervention program for children, encourage strong parental involvement. In this study, each mother's attendance during all sessions was recommended if possible (fathers were not available). For those who attended the sessions, new avenues to relate and

communicate with the child were opened up.

With regard to the music therapy sessions, as mentioned in section 1.2, the music therapist may actually reinforce the speech and language therapist's work with the child since listening is inherent to music and the musical parameters are also components of language (see also Appendix A).

#### **3.8.2.1.2 Therapeutic approach**

The researcher, who was also the therapist, employed many of the tenets of Carl Rogers' (1951) client-centered approach in both the music therapy and the play conditions in this study. In keeping with his humanistic approach, Rogers is concerned with the holistic understanding of the person. His assumption is that each person has the capacity and the motivation to change. A therapist who adopts a Rogerian approach should function in a non-directive manner, providing a permissive atmosphere of warmth, empathy, understanding, and 'unconditional positive regard'. To build a trusting relationship with the client, the therapist needs to be open and honest. The child is allowed to set the pace and to reveal his/her personal view of the world. The child does not feel threatened since the therapist fosters and appreciates the child's open expression of all different possible feelings. The therapy can then become a socializing experience because the child learns that there are acceptable outlets for such feelings and that they do not need to be denied. Because the child feels that he/she is accepted, rather than being judged and evaluated, he/she does not need to respond defensively and finds the courage to explore new ways of feeling and behaving.

Rogers states that "Once the child has undergone some personal change, however slight, his environmental situation is no longer the same" (p. 239). The therapy session provides freedom within clearly defined limits. First of all, the therapy is held at the same time and in the same place. Destruction of objects in the therapy room, or physically attacking the therapist is unacceptable behavior. The therapist enforces these limits consistently and in doing so, reduces the build-up of the child's anxiety. Even as the therapist enforces the limits, he/she accepts the child's desire to break them.

In this study, Rogers' non-directive approach was primarily employed, with a further development to a more guided and directed style of work in half of each session that would also be considered a natural progression of the therapist's



responsibility within a client-centered approach. The therapist encouraged the children through initiating and structuring activities more in that half of the session, building on the child's own initiative and interests. The child could exert control over the session by choosing his/her way to participate, or by declining to participate in any way. The therapist could then try again after a while and the child could choose again whether to follow or not. As in the undirected part of the session, the child felt respected and accepted for whatever he/she did, and his/her experience was one of control, which was so important to these children. The therapist made every effort to follow Rogers' approach in the directed part of the session as well, while still keeping with the procedures in the protocol.

This therapeutic approach enhances the activation of the 'music child'. This key concept was defined by Nordoff and Robbins (1977) as "that entity in every child which responds to musical experience, finds it meaningful and engaging, remembers music and enjoys some form of musical expression" (p. 1), no matter how disabled he/she is. It is the "individualized musicality inborn in each child" (p. 1). "The term has reference to the universality of musical sensitivity- the heritage of complex sensitivity to the ordering and relationship of tonal and rhythmic movement; it also points to the distinctly personal significance of each child's musical responsiveness" (p. 1). In order for the music child to function, the child has to be open to experiencing himself/herself, others and the world around him/her, since the 'music child' represents the "organization of receptive, cognitive, and expressive capabilities" (p. 1) As the child becomes deeply, personally involved, "he becomes emotionally involved not only in the particular music itself or in his activity in it, but also in his own self-realization and self-integration within all the therapy situation holds for him" (p. 2). The Rogerian approach permits this process to happen.

### **3.8.3 Phase III: Post-intervention procedures**

The third phase of the post-intervention procedures included:

1. Completing the post-intervention questionnaire;
2. Choosing video clips for parent interviews;
3. Parent interviews.

These steps will be now described in detail.

### **3.8.3.1 Post-intervention questionnaire**

The purpose of the post-intervention questionnaire was identical to the pre-intervention questionnaire, namely to provide some information regarding the child's music-related behaviors/experiences at home since the child was implanted with the additional requirement from the parents of taking into consideration the time that elapsed since the music therapy intervention and the play sessions. As with the pre-intervention questionnaire, the same procedure (section 3.8.1.3) was re-explained to the parents by the researcher and was written in the questionnaire as well. Each questionnaire was separately completed by the mother and father in order to get each one's independent perspective. The questionnaires were completed within two weeks upon the completion of the study (Appendix J- J1, J2) Data collection from the questionnaires as well as analyses will be described in section 3.9.3.

### **3.8.3.2 Choosing video clips for parent interviews**

As mentioned in section 3.4.5, the parent interview was based on watching ten minutes of selected short video clips from the music therapy sessions. These video clips were chosen by a systematic process that consisted of the following steps:

1. The researcher watched all the video material from the music therapy sessions for each child and chose those video clips that clearly demonstrated the greatest number of spontaneous communicative interactions. The video clips could be of different duration.
2. The best excerpts from the above chosen video clips, whose total duration was approximately 20 minutes, were downloaded to the computer and burned to a DVD. The number of clips on each DVD varied from one child to the other, but its total duration for each child was constant: approximately 20 minutes. The researcher rank-ordered these clips by giving the maximum points to the best clip and the minimum- to the one she considered to be the least good. Scoring was done as follows: If a specific DVD had 12 video clips, the best clip received 12 points and the least good - one point; if it had 14 clips, the best one got 14 points, etc. Each DVD was then duplicated.
3. As soon as the preparation of each DVD was complete, separate copies were given to two clinically experienced and qualified music therapists who also received guidelines from the researcher related to the procedure for choosing the video clips for the parent interview (Appendix R). They were asked to

independently watch each DVD, choose the clips they thought clearly demonstrated the greatest number of spontaneous communicative interactions and rank them as described above. They were purposely given only general instructions so that they would focus on their overall impressions of whether or not there was much communication going on, rather than on detailed definitions related to the different communicative interactions.

4. In order to obtain a final score for each video clip, the researcher added together the points from all three raters to get a final score for each clip. The clips that received the highest scores from the three raters and were of approximately 10 minutes duration were chosen for the parent interview. No tied scores occurred.

### **3.8.3.3 Parent interview**

After the clinical trials were completed for a specific child, and the video clips from the music therapy intervention were chosen and burned onto a DVD for the interview, the researcher contacted the parents and explained the interview procedure to them. The parents were aware that they were going to be interviewed because it was mentioned in the 'Parent information sheet' (Appendix B) they received prior to the research trials. As mentioned in section 3.4.5, the purpose of the interviews was to enable each parent to reflect on what he/she saw and felt in relation to the child's participation in this study.

The setting where an interview takes place can make a difference. People tend to feel more comfortable in a setting with which they are familiar. Therefore, the interviews were carried out in the nursery schools where the children were treated, except for one couple who was interviewed at their home due to personal difficulties. The interviewer was the clinical social worker from "Shemaya" in B'nei B'rak (an Orthodox community). There were two reasons for this decision:

- In order to avoid the parents being influenced in their answers, which could happen where they might feel they should either tell the researcher what they feel she expected or wanted to hear, of conversely the opposite, it was decided between the researcher and the supervisor that a person other than the researcher/therapist should undertake the interviews.
- It was important that someone close to the religious Jewish sector interview

the parents since most of them were Orthodox (O's, Ay's and C's parents, and Af's mother were Orthodox; Z's parents were Conservatives, but refused to be interviewed as will be explained later this section). The social worker from "Shemaya" was a Conservative Jew. Since she was religious, although not Orthodox, all parents (except for Z's) agreed to be interviewed by her. This obviously facilitated the establishment of rapport with the parents, an important issue when carrying out a semi-structured interview. It becomes even more so when a woman is interviewing Orthodox men.

The researcher discussed and advised the interviewer on each of the specific questions to address during the semi-structured interview. Also explored were ways the interviewer might handle parent responses that were not readily forthcoming, too short or too long and irrelevant.

During a semi-structured interview, the interviewer tries to encourage the development of a relationship of trust and openness with the interviewee. It can be difficult to develop rapport with an interviewee if the interviewer is attempting to take copious notes. It may also interfere with eye contact and non-verbal communication; therefore, audio-taping was preferred because this was less intrusive and allowed the researcher to accurately transcribe the interviewee's replies at a later date for analysis (Gall et al., 1999); however, taping the interview may also affect what is being said, because interviewees are not entirely comfortable and relaxed in the presence of tape or video recorder. To minimize this effect, the researcher explained to the parents why the recording was important and how it was going to be used. They were also told that they could switch the tape recorder off at any time.

All the parents gave their permission to record the interview and use the data for future analysis by signing consent forms (Appendix D). The interviews were recorded on a Sony Cassette-Corder TCM-200DV (section 3.5.3.2). None of the parents asked to switch off the tape recorder during the interview.

Prior to the commencement of the interview, the interviewer explained to the parents that they would be shown a 10 minute DVD of short video segments chosen from the music therapy sessions. The 10 minute clips were deemed a reasonable amount of time to give each parent the opportunity to better remember and process the material. The parents were asked to watch the video clips twice. The first viewing was to form an impression of the chosen video clips. The purpose of the second

viewing was to enable the parent to answer the questions in the interview more in depth should he/she choose to do so. The interviewer explained that before the second viewing, she would ask two specific questions regarding a moment that the parent liked the most in the video clips, and a moment, which he/she liked the least. These questions were designed to help the parent pinpoint his/her response to certain aspects of the video. Then she concluded the introduction by telling the parents that after each one answered the specific questions, she would ask each one of them a few more questions of a general nature.

Each pair of parents watched the DVD at the same time unless only one parent was willing to be interviewed, as in the case of C's mother. The interview was carried out on an individual basis, one parent after the other. When one parent was interviewed, the other one left the room. Watching the DVD and answering the interview questions lasted approximately one hour. The parent could use as much time as needed to answer the questions. The DVD was viewed on a laptop.

Out of ten parents (five pairs), only four mothers and three fathers were interviewed (Appendix M). As previously mentioned, C's father refused to watch the video clips due to his religious beliefs as an Orthodox Jew. Z's parents did not cooperate and refused to be interviewed. Z completed only 11 sessions out of 16 since she vehemently refused to come to the sessions. At that time, she was going through a difficult phase and also became uncooperative with other adults in most areas of her life, as reported to the researcher by the staff. This troubled time naturally affected her parents and stressed them to the limits of their tolerance. Some of this stress and frustration was directed at the therapist and resulted in their refusal to be interviewed.

As mentioned in section 3.4.4, C's, and Ay's mothers attended all sessions, except for unusual circumstances. Although they were familiar with all the selected video clips due to their attendance in the sessions, it was still relevant and valuable to interview them since during the sessions they may not have been totally focused on what was taking place. In addition, while the sessions were going on, they might have been going through a myriad of emotional experiences related to the child's behavior. Being interviewed, gave them the opportunity to share their thoughts and feelings, especially in the question designed specifically for them, which related to the comparison between their experiences during the sessions with what they were experiencing while watching the video clips (Additional benefits of the interviews were detailed in section 3.4.4).

The recorded interviews were precisely transcribed and translated into English. In an effort to retain the authenticity of the parent interviews, the translation was made as closely as possible to the parents' own words, phrases and speech rhythm patterns. The English was not polished. Repetitious phrases, in which the parents struggled to find an answer that reflected their feelings and thoughts, were not deleted from the translation. In the transcription, the researcher also noted whether there were pauses, sighs or laughter in the parent's answer.

### **3.9 Data collection and analysis**

This section presents the quantitative and the qualitative data collecting and analyses undertaken. The quantitative data were analyzed by using descriptive and inferential statistics. The qualitative data analysis included case study narratives and thematic analysis.

Data collecting and analyses will be presented as follows:

- Inter-observer reliability;
- Session data;
- Parent pre- and post-intervention questionnaires;
- Parent interviews.

#### **3.9.1 Inter-observer reliability**

Reliability in research is concerned with the question of measurement. Kazdin (1982) states that "when direct observations of behavior are obtained by human observers, the possibility exists that observers will not record behavior consistently" (p. 48). A way to strengthen the reliability of the results is to obtain inter-observer reliability, as recommended by Kazdin (1982). Establishing inter-observer reliability helps to ensure that the process has been fair, ethical, and rigorous (Richards et al., 1998). According to Kazdin (1982), inter-observer reliability is desirable since it improves the chances of obtaining consistency, of minimizing biases which the individual assessor may have, and of ascertaining whether the target behaviors were clearly defined. The use of permanent products such as DVD's enables reviewing them several times and thus, helps to achieve these goals.

"Unless a measure is reliable, it cannot be valid" (Robson, 2002, p. 101). Therefore, the data collection and analyses reporting observer reliability will be

presented first, as prerequisites to the other analyses.

There were four independent observers in this study, in addition to the researcher:

- One observer to establish reliability of target behaviors;
- One observer to establish reliability of the variable *session part*;
- Two observers to establish reliability of the Parent-Child ERA.

One of the two observers recruited to establish reliability of the Parent-Child ERA was also the observer for the Parent-Child ERA analysis.

### **3.9.1.1 Inter-observer reliability of target behaviors (dependent variables)**

As mentioned in section 3.9.2, all sessions were videotaped. The video material was downloaded to the computer and burned to DVD's for analysis. Prior to the actual video analysis, the researcher first trained herself and then intensively trained an independent observer<sup>38</sup> to identify the target behaviors and measure their frequency and/or duration data (see Appendix P, for coding guidelines) by using DVD's of a child who the researcher used as a trial subject, and whose data was not ultimately included in this study. The coding was done on a form designed specifically for the video observation (Appendix E).

For the actual video analysis, in order to determine inter-observer reliability, 25% of each child's video material (a total of 19 sessions of 20 minutes each, for all subjects) was randomly selected, observed and scored separately by the researcher and the independent observer, and Intraclass Correlation Coefficients (ICC) were then computed on the two sets of scores. The observer was blind to any information regarding research questions as well as to the session number. The results are presented in section 4.1.1.

### **3.9.1.2 Inter-observer reliability related to the independent variable *session part* (directed vs. undirected)**

The researcher, who was also the therapist, strictly followed the protocol guidelines in the directed and undirected parts of the session. In order to determine whether she had implemented the protocol guidelines in all four conditions of this study (DM and UM

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<sup>38</sup> The independent observer was an experienced kindergarten teacher, MA in Education.

as well as DP and UP), an independent observer was first provided with the definitions of the directed and undirected parts of a session, then watched the first two minutes from each session part (directed and undirected) of all the sessions (presented in random order), and subsequently documented as accurately as possible whether that part was directed or undirected. The observer was blind to any information regarding research questions as well as to the session number. Cohen's Kappa was then used to compute inter-observer reliability. The results are presented in section 4.1.2.

Computing inter-observer reliability was carried out in order to strengthen procedural reliability, which is defined as "a measure of the extent to which the actual application of the independent variable over the course of an experiment matches its description in the method section of the research report" (Cooper et al., 1987, p. 239). It also refers to the issue "treatment integrity", which is "the extent to which the independent variable is implemented or carried out as planned" (Cooper et al., 1987, p. 237), or what is also known as "treatment fidelity"; both terms refer to the uniformity, accuracy, consistency, and replicability of a treatment delivered in a particular research setting, as pointed out by Hennessey and Rumrill (2003). The authors indicate that assurance of treatment fidelity is the first step toward accurately ascribing changes in the dependent variable to systematic changes in the treatment or independent variable.

### **3.9.1.3 Analysis related to therapist's behavior**

#### **3.9.1.3.1 Parent-Child ERA inter-observer reliability**

To increase internal validity, a procedure was administered to find out whether the therapist in her dual role consistently demonstrated similar affective and behavioral characteristics in UM and DM as well as in UP and DP. Before answering this question, a reliability analysis was carried out. Two independent observers<sup>39</sup> rated the therapist's interactions with each child by watching the middle five minutes from each half (directed and undirected) of one session randomly chosen for each child (see Figure 3.1), and rating it on 14 variables taken from the Parent-Child ERA (see section 3.4.3).

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<sup>39</sup> The two observers, who were chosen for this procedure, were psychology students who had extensive training using this assessment prior to serving as observers for this study.



Session x

0-----2.5-----7.5-----10-----12.5-----17.5-----20→ time (minutes)

The observed time intervals are marked in grey.

**Figure 3.1. Time sampling by observers using Parent-Child ERA**

The middle five minutes were selected as the optimum section to watch since the initial section can be influenced by the events that happened to the child before the child entered the room, and the last section can be influenced by any decay in attention. The two observers were blind to any information regarding research questions as well as to the session number, but they knew whether they were watching a directed part of a session or an undirected part, since this information had to be taken into consideration while rating the therapist's interactions. They were given the definitions of the directed and undirected parts of the sessions as detailed in section 3.7.

As the sample in this research was small, percentage agreement reliability was computed for their ratings. (Appendix U) The results are presented in section 4.1.3.1.

**3.9.1.3.2 Parent-Child ERA analysis**

To further address the above mentioned issue of potential bias, one of the independent observers watched the middle five minutes from each half (directed and undirected) of three additional sessions randomly chosen for each of the four children (A, As, O, and C). The observer followed the same procedure for two additional sessions for Z (since she completed only 11 sessions out of 16). Then, she rated the therapist's interactions with each child on 14 variables taken from the Parent-Child ERA. In order to evaluate the presence or absence of a difference between the ratings in the play condition and the music therapy condition, means and SD's were computed.

As in the previous section, the observer was blind to the research questions as well as to the session number, but she knew whether she was watching a directed part of a session or an undirected part since this information had to be taken into consideration while rating the therapist's interactions (Appendix V). The results are presented in section 4.1.3.2.

### 3.9.2 Session data analysis

This section describes the procedures undertaken for the main analysis of data concerned with reporting the frequency and duration of the target behaviors from the complete video recordings. Following the calculation of inter-observer reliability on 25% of the video material (see section 3.10.1.1), the complete video recordings for all five children (75 sessions of 20 minutes each) were observed and analyzed by the researcher. The analysis included frequency data of all four variables (initiation, imitation, turn-taking and synchronization), data recording the duration of synchronization and turn-taking, and the number of events of turn-taking. This lengthy analysis was done in stages:

1. Downloading the video recordings from the two video cameras to the computer by using the computer software WinDVD Creator 2 (see section 3.5.3.1);
2. Burning the material to DVD's;
3. Watching the DVD's and selecting the material which had the best quality as well as clearly showed the interactions between the child and the therapist;
4. Analyzing the sessions by using the computer software ASUS DVD XP (ASUSTek Computer Inc., 2002), which enables slower speed viewing. When identifying the therapist-child interactions on the DVD was difficult or impossible, another DVD that showed the same video material (but filmed from a different angle by the second video camera) was used for analysis. Each time the researcher identified one of the target behaviors, she wrote their frequencies and/or durations on the session analysis coding sheet (see Appendix E) and totaled the scores in preparation for statistical analysis.

In order to answer the primary research question and its sub-question (see section 2.4.1), all the dependent variables were analyzed according to seven questions. Each of these questions, which examine differences in frequency and/or duration data, included six comparisons between the two conditions, music therapy and play. These comparisons are presented by the sign '√' in Table 3.6.

**Table 3.6. Six comparisons between the music therapy and play conditions**

	<b>UP</b>	<b>UM</b>	<b>DP</b>	<b>DM</b>
<b>UP</b>				
<b>UM</b>	√			
<b>DP</b>	√	√		
<b>DM</b>	√	√	√	

The questions addressed in the analysis were as follows:

1. What are the differences in frequency of spontaneous imitation (Six different comparisons as in Table 3.6)?
2. What are the differences in frequency of spontaneous initiation (Six different comparisons as in Table 3.6)?
3. What are the differences in frequency of spontaneous synchronization (Six different comparisons as in Table 3.6)?
4. What are the differences in frequency of spontaneous turn-taking (Six different comparisons as in Table 3.6)?
5. What are the differences in duration of spontaneous synchronization (Six different comparisons as in Table 3.6)?
6. What are the differences in duration of spontaneous turn-taking (Six different comparisons as in Table 3.6)?
7. What are the differences in the number of events of spontaneous turn-taking (Six different comparisons as in Table 3.6)?

Prior to the statistical analysis, the researcher examined the distributions of values for all the dependent variables (Appendix W). As was expected with counts and frequency data, these data did not follow a normal distribution but rather what is known as a Poisson distribution (Upton & Cook, 2002). Therefore, the dependent variables were analyzed by a Generalized Linear Mixed Model (GLMM). This analysis is analogous to the more traditional repeated measures Analysis of Variance (ANOVA), but allows for greater flexibility in dealing with various forms of distribution of data. Such distributions can be modeled with GLMMs, but not with traditional ANOVAs. In this study, GLMMs were fitted using a Penalized Quasi-

Likelihood (R Version 2.1.0, R Development Core Team, 2005; function `glmmPQL` in R package MASS, Venables & Ripley, 2002, pp. 297-298). As a sensitivity analysis, the researcher also calculated ANOVAs of more traditional Linear Mixed-Effects Models, based on a normal distribution (function `lmer` in R package lme4).

As previously mentioned, the complete video recordings for all five children (75 sessions of 20 minutes each) were observed and analyzed by the researcher. Inferential statistical analyses were carried out on the frequency and/or duration data points collected during the video analysis for each variable, from each of the subjects for the small sample. The statistical analyses undertaken enabled the researcher to search for differences between conditions within this small sample. The results are presented in section 4.2.1.

### **3.9.3 Supplementary analysis of parent questionnaires (quantitative and qualitative data)**

As described in sections 3.8.1.3 and 3.8.3.1, each set of parents (5 pairs altogether) separately completed two questionnaires. One questionnaire was completed within the two weeks prior to the beginning of the clinical trials, and one- within the two weeks after the trials were over. The purpose of these questionnaires was detailed in the above mentioned sections. The different analyses that were undertaken on both the quantitative and the qualitative data are presented below.

#### **3.9.3.1 Analysis of the quantitative data (Likert-type and ‘yes/no’ questions)**

An internal consistency analysis (Chronbach’s alpha) was computed for each of the Likert-type sub-scales (questions 1, 2 and 7), followed by an additional analysis of internal consistency in order to examine whether these three sub-scales could be combined in an overall scale. The results are presented in section 4.2.2.

In order to find out whether there were significant differences between the fathers and the mothers’ ratings, separately, on the pre- and post-intervention Likert-type questions (questions 1, 2, 7, 8, 9 and 10), each parent’s response was scored<sup>40</sup> and an overall score was computed, for the pre- and post-intervention questionnaires, by summing those scores. Paired sample t-tests for the mothers’ pre- and post-intervention questionnaires and same for the fathers’ were carried out using SPSS

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<sup>40</sup> e.g., Never=1, Seldom=2, Occasionally=3, Frequently=4, Almost always=5, in case of a desirable result, or ‘Never’=5, ‘Seldom’=4, Occasionally=3, Frequently=2, Almost always=1, in case of an undesirable result.

version 14.0 software. The results are presented in section 4.2.2.1.1.

Questions 2, 3, 4, 5, 6, 9 and 11 included a 'yes/no' response from the parent. In order to find out whether there were significant differences between the 'yes/no' questions on the pre- and post-intervention questionnaires for fathers and mothers, separately, Fisher's exact test was carried out, using the R software. The results are detailed in section 4.2.2.1.2.

### **3.9.3.2 Analysis of the qualitative data (free-text answers)**

All questions in the questionnaires also included voluntary free-text answers (see section 3.4.2). As a first step, these answers were extracted from the questionnaires and re-copied to a Word document to give the researcher easy visual access to all the parent's answers (see Appendix S). The researcher then examined these answers in order to determine areas of agreement or commonalities necessary to create categories. The results are presented in section 4.2.2.2. Since the parents' answers included many individual differences, rather than summarizing and categorizing the comments, these comments as well as other information from the questionnaires and interviews were integrated as a case study narrative on each child, in order to present a deeper understanding and perspective of each parent's perception of their child. The case study narratives are presented in the results chapter, in section 4.2.4.

### **3.9.4 Supplementary qualitative analysis of parent interviews**

The parent interviews were transcribed (Appendix M), translated to English, and a thematic analysis was carried out in order to explore and interpret information emerging from the parent's reflections and thoughts in relation to the child's participation in music therapy after watching short video clips from the music therapy intervention. The thematic analysis was carried out in the following stages (The Miles & Huberman approach, as cited in Robson, 2002, p. 477, served as inspiration for these stages):

- The researcher read the transcript several times, using one side of the margin to note down anything that impressed her as particularly interesting or significant regarding the parent's answers/comments.
- The other margin was used to document emerging sub-theme titles by using key words that capture the essential quality of what was noted in the first

margin as being interesting or significant information.

- The sub-themes were listed on a separate page. The researcher looked for similar patterns or characteristics among them in order to cluster them together to coding categories, or themes.
- This process of sifting and sorting the material was repeated several times in order to identify newly emerging sub-themes.
- Finally, a list of central themes and their sub-themes was written down and coded. These themes seemed to capture most strongly the parents' concerns on the questions raised for them in the interviews. All sub-themes, whether recurring or appearing only once, were written down, since each held kernels of relevant and important information.
- Frequency of occurrence of each sub-theme was counted in all interviews to determine which themes were the most common and which- the least common. If a sub-theme appeared in an interview more than once, its frequency was noted. In addition, each sub-theme was counted in the fathers' and the mothers' interviews, separately, in order to discern quantitative and qualitative differences and/or similarities between the genders.
- The parent's statements and/or comments were grouped into themes (see Appendix T) and two examples for each sub-theme, one given by a father and one by a mother, were quoted from the interviews to further illustrate these sub-themes.

The results of this analysis are presented in section 4.2.3.

### 3.10 Validity

Validity in research refers to whether the method actually investigates what it is intended to (Kazdin, 1982). Prickett (2005) states that one way to use validity is to consider internal validity versus external validity:

- (a) *Internal validity* refers to the extent to which an experiment rules out alternative explanations of the results (Kazdin, 1982, p. 77), or in other words, "the level of certainty that the experimental treatment has a causal influence on the dependent variable" (Gall et al., 1999, p. 235);
- (b) *External validity* refers to the degree to which the researcher may have

confidence that he/she will obtain the same or similar results if he/she uses the same or very similar experimental procedures with other individuals, with other target behaviors, or in other settings (Richards et al., 1998, p. 96). Prickett (2005) adds that “the integrity of any research depends on the maintenance of both internal and external validity “(p. 55).

As indicated in section 3.4.4, in an attempt to increase internal validity, the Parent-Child ERA was administered in order to find out whether the therapist consistently demonstrated similar affective and behavioral characteristics in both session parts of the music therapy and the play conditions. The results that will be presented in section 4.1.3.2 will show that this procedure did indeed increase internal validity.

Gall et al. (1999) write that single case designs lack external validity, because the research participants are not randomly selected, and the experiment involves only one or a few individuals. The authors add that replication, which involves repeating the experiment with other individuals, is thus the best way to increase external validity. The more replications included within a study, the less changes in the dependent variables are attributable to extraneous or confounding variables (Richards et al., 1998, p. 96). In an effort to strengthen validity, the consistent protocols for music therapy and play were undertaken with the first child in this study, and were then replicated with four more children (see section 3.1). Cooper et al. (1987) describe two major types of scientific replication: direct and systematic. In direct replication, “the researcher makes every effort to duplicate exactly the conditions of an earlier experiment. If the same subject is used in a direct replication, the study is an intra-subject replication. An inter-subject direct replication maintains every aspect of the earlier experiment except that different, although similar, subjects are involved” (p. 242). In systematic replication, “any aspect of the replicated experiment can be slightly changed: subjects, setting, administration of the independent variable, and target behaviors. The generality of a given treatment is enhanced when it produces similar effects in widely varying conditions” (p. 242). In the present study, replication was inter-subject direct replication. Cooper et al. (1987) emphasize that although intra-subject replication (namely, using the same subject) is the primary tactic for establishing the reliability of a functional relationship, only through inter-subject replication can the generality of an experimental finding be determined.

In observational research, validity has not received much attention and observations have been considered inherently valid as long as they are based on direct sampling of behavior and require minimal inference on the observers' part (Goldfried & Linehan, as cited in Hartman, 1984, p. 130). Another way to use validity is to consider content validity, criterion-related validity and construct validity (Gall et al., 1999, pp. 133-135; Prickett, 2005). One of these, content validity, is relevant to this study. This type of validity is claimed to be especially important in the initial development of a behavior-coding schema. It is assessed by determining the adequacy with which an observation instrument samples the behavioral domain of interest. The variables, which were considered relevant to this research, were chosen after reviewing them with experts in the area. In addition, providing the same treatment twice (in the A-B-A-B design), replicated the functional relationship between music therapy and the behaviors under investigation and thus, gives more evidence to this relationship (Richards et al., 1998; Wheeler, 1995). Content validity is also relevant to the questionnaires designed for this study. It concerns the extent to which the items on the questionnaires reflect all the facets of the content area being studied. Although there were no available questionnaires for parents on music and young deaf children with CI, the researcher's past clinical experience with children with HI, Gfeller's articles (particularly Gfeller et al., 1999b), the design of the questionnaires and their pre-testing by giving them for review to a family of a deaf child with CI (see section 3.4.2), all served to obtain the most basic level of validity, which is face validity. Unlike content validity, face validity does not depend on established theories for support (Fink, 1995), and it is the beginning step of the validation process. It actually means that the questionnaires seemed an appropriate way to elicit information about music experiences of young deaf children with CI.

### **3.11 Ethics**

As with all research involving humans, this study was carried out according to ethical rules and was approved by the Helsinki Committee (project no. 04-158), Tel Aviv Sourasky Medical Center, affiliated with the Tel Aviv University, Sackler Faculty of Medicine, Israel.

Other ethical considerations referred to throughout the study were the following forms:

- Parent information sheet (Appendix B);



- Consent forms (Appendices C & D).

The procedures related to the first form are detailed in sections 3.8.1.1; the procedure related to the consent forms is described in section 3.8.1.1 and 3.8.3.3.

Finally, the results of this study were reported to the parents as well as recommendations related to music experiences in their children's daily life.

### **3.12 Conclusion**

This chapter detailed the mixed methods used in this study in an attempt to maximize the information about the effect of music therapy on spontaneous communicative interactions of children with CI. Data collection was carried out using three different tools: the main one being video analysis, and the two secondary ones being the parent pre- and post-intervention questionnaires and semi-structured interviews. The emphasis in the method was on the use of a flexible protocol which the therapist followed during the two conditions implemented in this study: music therapy and play, in addition to the two different parts that each session consisted of- the part that was directed by the therapist and part that was not directed by her. The general principles and procedures of the protocol undertaken during the clinical trials were described as well as the therapeutic approach of the therapist.

The results of the three procedures- video analysis, questionnaires and interviews are presented in the next chapter. In the discussion, the appropriateness as well as the limitations of the research method will be reviewed and considered.

## Chapter 4

### Results

#### Introduction

This chapter presents the quantitative and qualitative analyses of the pooled data. First, the analysis reporting observer reliability will be presented, as prerequisites to the other analyses. This will then be followed by the results of the analysis of the dependent variables related to the subjects' behavior from the video data of music therapy sessions and play sessions, as well as additional supplementary analyses of parent pre- and post-intervention questionnaires and parent interviews.

The results reported below come from the analyses undertaken to answer the primary research question and sub-question that were derived from the overall hypothesis for this study, which stated that following cochlear implantation, young children who receive music therapy will exhibit an increase in frequency and/or duration of specific spontaneous communicative interactions (imitation, initiation, turn-taking and synchronization).

#### Terms and abbreviations

In order to avoid repetition and redundancy, the following glossary of terms, (previously defined in section 3.7) and their acronyms will be re-stated here as a key to understanding their consistent usage in the presentation of the results.

**DM (Directed Music experience-** directed by therapist): The music experience, in which the music therapist and toddler engage in music activities predominately initiated, guided, structured and encouraged by the therapist.

**UM (Undirected Music experience-** not directed by therapist): The music experience in which music therapist and toddler spontaneously engage in music activities predominately initiated and structured by the toddler.

**DP (Directed Play-** play directed by therapist): Play activities in which music therapist and toddler engage in games or playing with toys, predominately initiated, guided, structured and encouraged by the therapist.

**UP (Undirected Play-** play not directed by therapist): Play activities in which music therapist and toddler spontaneously play with games and toys which are predominately initiated and structured by the toddler.

**Parent-Child Early Relational Assessment** (Parent-Child ERA) (Clark, 1999; Clark et al, 1980, 1984): An assessment designed to measure the quality of affect and behavior in parent-child interactions. In this study, part of this assessment was used to measure the music therapist's affect and behavior in therapist-child interactions

**Pre- and post-intervention questionnaires:** Pre-intervention questionnaire is the questionnaire that the parents completed within the two weeks prior to the beginning of the clinical trials. Post-intervention questionnaire is the questionnaire which they completed within the two weeks after the trials were over.

#### **4.1 Results: Reliability**

Results related to observer reliability will be presented as follows:

4.1.1 Inter-observer reliability of target behaviors (dependent variables)

4.1.2 Inter-observer reliability related to the independent variable *session part* (directed vs. undirected)

4.1.3 Analysis related to therapist's behavior

4.1.3.1 Parent-Child ERA inter-observer reliability

4.1.3.2 Parent-Child ERA analysis

##### **4.1.1 Inter-observer reliability of target behaviors (dependent variables)**

As explained in section 3.9.1, a valid measure must be reliable. Therefore, this must be tested through observational studies, before any other analyses can take place. Inter-observer reliability actually gives a score between 0 to 1 of how much consensus there is in the ratings or scores given by the observers.

In order to evaluate inter-observer reliability, 25% of each child's video material (a total of 19 sessions of 20 minutes each, for all subjects) was randomly selected, observed and scored by an independent observer (see section 3.9.1.1). The researcher and the independent observer, separately, scored each target behavior as a frequency or duration sum score, and Intraclass Correlation Coefficients (ICC) were then computed. Table 4.1 presents the inter-observer reliability of all dependent variables.

**Table 4.1. Inter-observer reliability of dependent variables in session analysis**

<b>Variable</b>	<b>Agreement ICC</b>
Spontaneous imitation	0.99
Spontaneous initiation	0.94
Spontaneous turn-taking	0.96
Spontaneous synchronization	0.93
Duration of spontaneous synchronization	0.76
Duration of spontaneous turn-taking	0.92
Number of events of spontaneous turn-taking	0.91

The correlations reported in this table show that with one exception (0.76), all the ICC's were above 0.90. The very high inter-observer reliability on six variables out of seven indicates a high level of agreement between the researcher and the independent observer for these variables. For duration of spontaneous synchronization, the ICC of 0.76 still represents a relatively high level of agreement between the two observers.

In order to assure that a behavior could be described and identified as spontaneous synchronization, it was deemed necessary during the process of analyzing the results to establish a minimum time period of two seconds (or more) of this behavior taking place, so that the observers can be sure that it could be described and identified as spontaneous synchronization. The majority of events actually did last for more than two seconds. However, seven events of spontaneous synchronizations of two seconds were counted because it was noted that even in these short events, the child clearly attempted to simultaneously match the therapist's action, e.g., the child tried to match either the rhythm of the music in the music therapy sessions or stretched out his/her hands to hold a toy/game together with the therapist.

#### **4.1.2 Inter-observer reliability related to independent variable *session part* (directed vs. undirected)**

In order to find out whether the therapist had implemented the protocol guidelines in relation to session part (directed or undirected), in all four conditions of this study (DM and UM as well as DP and UP), an independent observer watched the first two minutes from each session part, for all sessions randomly presented, and documented as accurately as possible whether that part was directed or undirected (see section 3.9.1.2). Cohen's Kappa was used to compute inter-observer reliability for these nominal variables and was found to be 0.89. Landis and Koch (1977) consider Kappa

of 0.40 to 0.59 as moderate inter-rater reliability, 0.60 to 0.79 as substantial and 0.80 or above as outstanding.

### **4.1.3 Analysis related to therapist's behavior**

#### **4.1.3.1 Parent-Child ERA inter-observer reliability**

As explained in section 3.1, the music therapist in this study was also the researcher. In order to increase internal validity, a procedure was administered to find out whether the therapist consistently demonstrated similar affective and behavioral characteristics in UM and DM as well as in UP and DP. Before answering this question, a reliability analysis was undertaken. Two independent observers rated the therapist's interactions with each child, by watching the middle five minutes from each half (directed and undirected) of one session randomly chosen for each child, and rating it on 14 variables taken from the Parent-Child Early Relational Assessment (Parent-Child ERA) (Clark, 1999; Clark et al, 1985) (The procedure is detailed in section 3.9.1.3.1). As the sample in this research was small, percentage agreement reliability was computed for their ratings, and found to be 72.14 % or 94.25% (see Appendix U), obtained by dividing the number of agreements by the overall number of observations and multiplying this ratio by 100. These two different percentage agreements were calculated and presented to demonstrate two different computing methods found in the literature in relation to the Parent-Child ERA<sup>41</sup>.

#### **4.1.3.2 Parent-Child ERA analysis**

To further address the above mentioned issue of bias due to the therapist's intentions in the dual role of therapist and researcher, one of the independent observers watched three additional sessions for each child, and rated the therapist's interactions with the child as described in section 3.9.1.3.2 (see also Appendix V). In order to evaluate the presence or absence of a difference between the ratings in the play condition and the music therapy condition, means and SD's were computed. The results are presented

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<sup>41</sup> According to one method, which resulted in the lower percentage agreement of 72.14%, an agreement exists if the observers use the same rating point on the 5 point scale for rating a specific item. The rationale for the other method, which resulted in the higher percentage agreement of 94.25%, is that it may be difficult at times to get an exact agreement as it is not a frequency count, time sampling approach. Therefore, 1's & 2's rating points, which are considered as 'areas of concern' on the PCERA, are accepted as an agreement. Same for points 4's & 5's, which are considered as 'areas of strengths'. Ratings of 2's and 3's or 3's and 4's are *not* considered as an agreement (Clark, 1999; Harel, 1995).

in Table 4.2.

**Table 4.2. Means and standard deviations for Parent-Child ERA analysis**

	Mean	Standard deviation
Play condition	4.75	0.55
Music therapy condition	4.68	0.69

The results comparing the play condition and the music therapy condition are very close indicating almost no difference in the interactional behavior of the therapist in play and in music therapy.

*In summary*, the results for observer reliability showed very high inter-observer reliability for six variables and high for a seventh variable, attesting to the high reliability of the data.

## **4.2 Results: Effects of music therapy**

The results of the analysis of dependent variables as well as the parent questionnaires and interviews will be presented in the following order:

### **4.2.1 Session analysis: Main effects and interactions**

#### **4.2.1.1 Frequency of spontaneous imitation**

#### **4.2.1.2 Frequency of spontaneous initiation**

#### **4.2.1.3 Frequency of spontaneous synchronization**

#### **4.2.1.4 Frequency of spontaneous turn-taking**

#### **4.2.1.5 Duration of spontaneous synchronization**

#### **4.2.1.6 Duration of spontaneous turn-taking**

#### **4.2.1.7 Number of events of spontaneous turn-taking**

### **4.2.2 Supplementary analyses of parent pre- and post-intervention questionnaires**

#### **4.2.2.1 Analysis of the quantitative data**

##### **4.2.2.1.1 Analysis of the Likert-type questions**

##### **4.2.2.1.2 Analysis of the ‘yes/no’ questions**

#### **4.2.2.2 Analysis of the qualitative data (free-text answers)**

### **4.2.3 Supplementary qualitative analysis of parent interviews**

#### **4.2.3.1 Thematic analysis**

#### **4.2.3.2 Comparison of fathers’ and mothers’ responses**

#### 4.2.4 Case study narratives based on free-text answers from the parent questionnaires and interview material

For the purpose of clarity, each of the above topics will be re-presented below and followed by its relevant research question as well as analysis and results.

##### 4.2.1 Session analysis: Main effects and interactions

The analysis of target behaviors (dependent variables) was carried out in order to answer the following questions:

*Primary question:*

Does music therapy enhance spontaneous communicative interactions of young children, following cochlear implantation?

*Sub-question:*

Among these children, is the frequency and/or duration of spontaneous communicative interactions significantly greater in *undirected*<sup>42</sup> or *directed* music and play experiences?

The independent variables were:

- 1) *Condition*: music therapy vs. play
- 2) *Session part*: directed vs. undirected
- 3) Interaction of *condition* with *session part*

The dependent variables were analyzed by using the complete video recordings, for all five children (75 sessions of 20 minutes each; see section 3.9.2). The analysis included frequency data of all four variables (initiation, imitation, synchronization and turn-taking), duration for synchronization and turn-taking, and number of events of turn-taking.

In order to answer the primary question and its sub-question, all the dependent variables were analyzed according to seven questions formulated and presented in section 3.9.2. Each of these questions, which examine differences in frequency and/or duration, includes six comparisons between the two conditions, music therapy and

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<sup>42</sup> The undirected and directed approaches are explained in the Method chapter, section 3.7.

play. These comparisons are presented in Table 3.6.

All dependent variables involving counts and frequencies of events were analyzed by a Generalized Linear Mixed Model (GLMM). This analysis is analogous to the more traditional repeated measures Analysis of Variance (ANOVA), but allows for greater flexibility in dealing with various forms of distribution of data. Count and frequency data typically follow a Poisson distribution (Upton & Cook, 2002). Such distributions can be modeled with GLMMs, but not with traditional ANOVAs. In this study, GLMMs were fitted using Penalized Quasi-Likelihood (R Version 2.1.0, R Development Core Team, 2005; function `glmmPQL` in R package MASS, Venables & Ripley, 2002).

As a sensitivity analysis, the researcher also calculated ANOVAs of more traditional Linear Mixed-Effects Models, based on a normal distribution (function `lmer` in R package `lme4`). The use of these models would not have altered the conclusions. Therefore, only the `glmmPQL` models using the more appropriate Poisson distribution were retained and are presented here.

Inferential statistical analysis was undertaken on the frequency and/or duration data points collected during the video analysis for each variable, from each of the subjects (75 sessions of 20 minutes each). Due to the small number of subjects, test power was relatively low, although the use of multiple measurements in each subject may partly compensate for this. A power calculation was not carried out because the main focus of the study was on observing the individual subjects' spontaneous communicative interactions. The low test power implies that inferential statistics may yield non-significant results even if the therapy was effective. Significant results, however, are valid with the nominal significance level. Because of the low test power, particular emphasis was placed on descriptive analysis, as opposed to relying strongly on the interpretation of p-values.

All analyses and significant effects will be now presented in detail. The values presented in the text all follow the publication manual of the American Psychological Association (2001) requirements of a maximum value to three decimal points (.001), but there are several examples where a much higher significance level was reported in the analyses. The reader may refer to Appendix X for the actual p-values.



#### 4.2.1.1 Frequency of spontaneous imitation

The first analysis reports the differences in frequency of spontaneous imitation when comparing the music therapy condition and the play condition (six different comparisons, as explained in section 3.9.2). Table 4.3 presents the results of a repeated measures ANOVA.

**Table 4.3. ANOVA table for the Generalized Linear Mixed Model (GLMM) of frequency of spontaneous imitation**

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p- value
Condition	1	141	70.61	***
Session part	1	141	2.90	0.09
Condition x Session part	1	141	0.22	0.64

\*\*\* $p < .001$

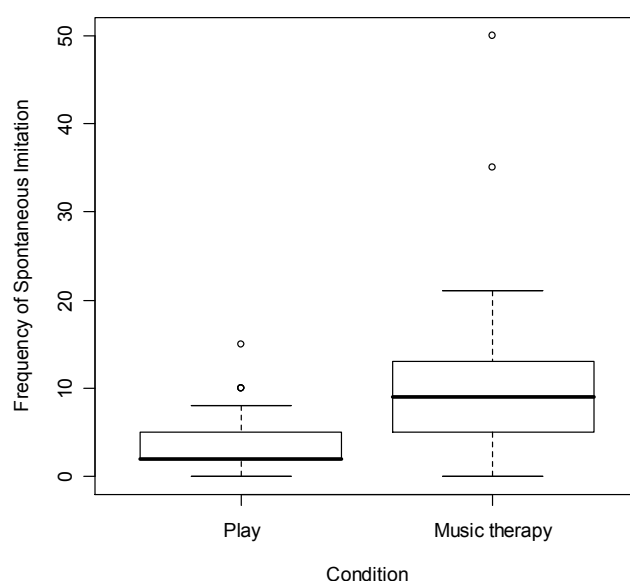
Table 4.3 shows a significant effect ( $p < .001$ ) of the *condition* variable, which indicates that the frequency of spontaneous imitation is significantly greater in the music therapy condition than in the play condition.

There was no significant main effect for the independent variable *session part*, nor was there any significant interaction between *condition* and *session part*.

Figure 4.1 depicts these results in a boxplot. Boxplots can be used for the comparison of several samples, and will depict all the followed significant results of the dependent variables; therefore, a detailed explanation of a boxplot will be now presented.

The **boxplot (box-whisker diagram)**, is a graphic representation of numerical data, without any assumptions of statistical distribution. In descriptive statistics, a **boxplot** represents the five-number summary, which consists of the smallest observation, lower quartile, the median value, upper quartile, and the largest observation. The x-axis represents independent variables (either music therapy vs. play, or undirected session part vs. directed session part). The y-axis represents the scoring ranges of the dependent variables (either frequency or duration data). Every rectangular box represents the results of the first to the third quartile (i.e. 25 to 75 percentile) which is the inter-quartile range (IQR); thus, the area in the box represents the middle 50% of the scoring range. The bold line inside the box indicates the

median value. Vertical tic marks, or ‘whiskers’, are then drawn extending above and below the box to the greatest and least observed values. The whiskers extend, at most, to 1.5 times the inter-quartile range. Any values beyond the ends of the whiskers are shown individually as outliers and are indicated by the presence of open dots. In other words, an outlier is a data point which lays *more* than 1.5 times IQR lower than the first quartile, or 1.5 times IQR higher than the third quartile (Everitt, 1996, pp. 30-32; Upton & Cook, 2002, p. 47).



**Figure 4.1. Frequency of spontaneous imitation by condition**

This boxplot (Figure 4.1) shows that the area of music therapy is greater than that of the play condition. From the dimensions of the music therapy box, one can see that its lower border is approximately at the same height as the upper box line for play. In addition, the median value is higher and the whiskers extend further in music therapy than in play. This result suggests that music therapy yielded a much greater incidence of spontaneous imitations than play.

#### **4.2.1.2 Frequency of spontaneous initiation**

Table 4.4 presents the results of a repeated measures ANOVA for frequency of spontaneous initiation and shows a significant effect ( $p < .001$ ) of the *condition* variable. This indicates that the frequency of spontaneous initiation is significantly greater in the music therapy condition than in the play condition.

No significant effect was found for the independent variable *session part* ( $p = .06$ ); however, the result may have reached significance, with a larger sample.

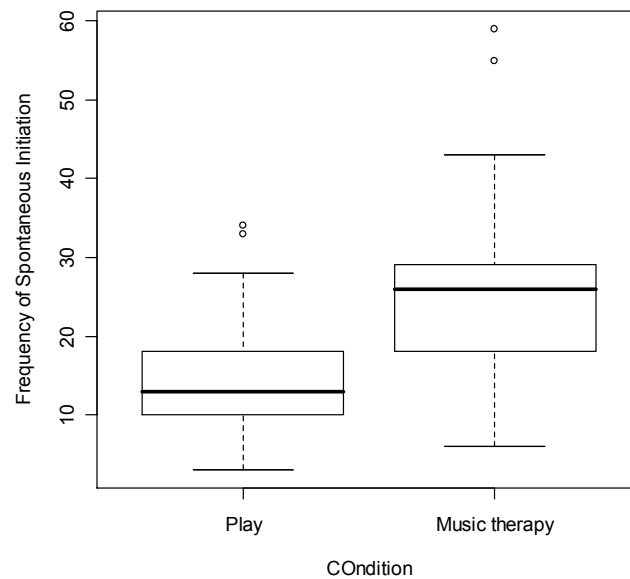
No significant effect was found for the interaction of *condition* with *session part*.

Figure 4.2 depicts the results in a boxplot.

**Table 4.4. ANOVA table for the GLMM of frequency of spontaneous initiation**

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p- value
Condition	1	141	74.65	***
Session part	1	141	3.55	0.06
Condition x Session part	1	141	1.84	0.18

\*\*\* $p < .001$



**Figure 4.2. Frequency of spontaneous initiation by condition**

Viewing the plot for spontaneous initiation (Figure 4.2), one can see that the lower border of the music therapy box is approximately at the same height as the play's upper box line. In addition, the music therapy area box is greater, the median value is higher, and the whiskers extend further than for play. This boxplot documents the greater frequency of spontaneous initiation in the music therapy sessions than in the play sessions.

#### 4.2.1.3 Frequency of spontaneous turn-taking

Table 4.5 presents the results of a repeated measures ANOVA on differences in frequency of spontaneous turn-taking when comparing music therapy and play.

**Table 4.5. ANOVA table for the GLMM of frequency of spontaneous turn-taking**

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	141	45.95	***
Session part	1	141	6.49	0.01
Condition x Session part	1	141	2.67	0.10

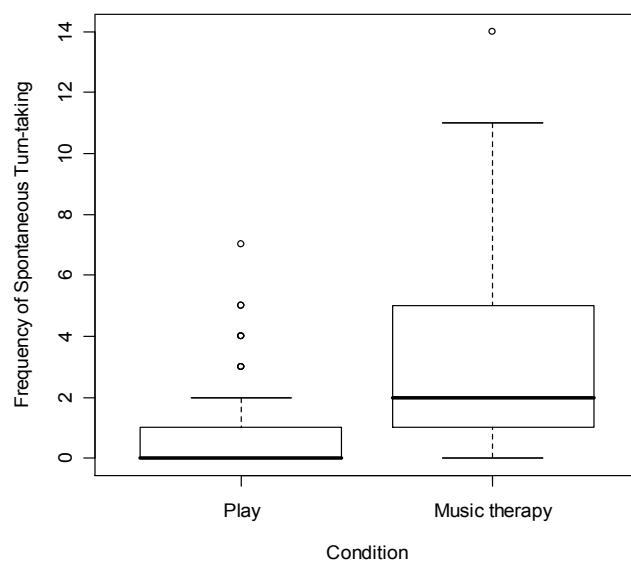
\*\*\* $p < .001$

A significant effect ( $p < .001$ ) was found for the variable *condition*. This result indicates that the frequency of spontaneous turn-taking is significantly greater in music therapy than in play.

A significant effect ( $p < .05$ ) was also found for the variable *session part*. This result indicates that spontaneous turn-taking occurred more frequently in the undirected part of both the music therapy and the play sessions, than in the directed part.

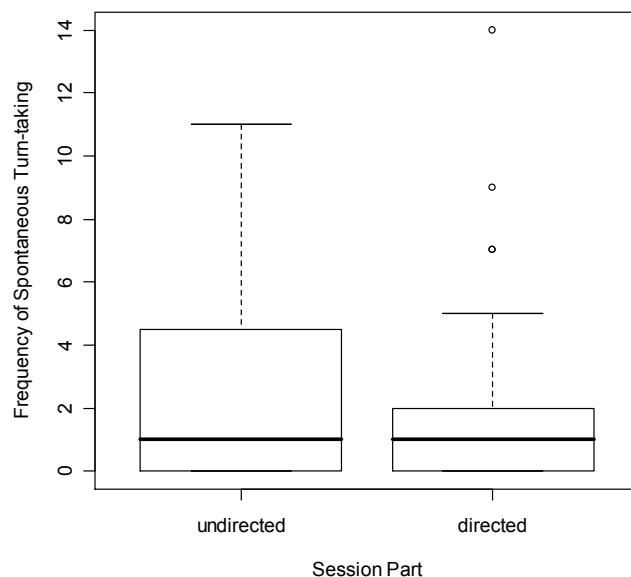
No interaction effect was found for *condition* with *session part*.

Figures 4.3 and 4.4 depict these results in boxplots.



**Figure 4.3. Frequency of spontaneous turn-taking by condition**

As with the previous two communicative interactions, the boxplot for spontaneous turn-taking (Figure 4.3) shows a noticeable difference between the music therapy and the play conditions confirming that spontaneous turn-taking occurred much more frequently in the music therapy than in the play condition.



**Figure 4.4. Frequency of spontaneous turn-taking by session part**

Although the lower border and median value for the undirected and directed session parts (Figure 4.4) are essentially the same, the much larger area of the

undirected box supports the conclusion that spontaneous turn-taking occurred much more frequently during the undirected part of the session than during the directed part for both the music therapy and play conditions.

#### 4.2.1.4 Frequency of spontaneous synchronization

Table 4.6 presents the results of a repeated measures ANOVA on differences in frequency of spontaneous synchronization when comparing music therapy and play.

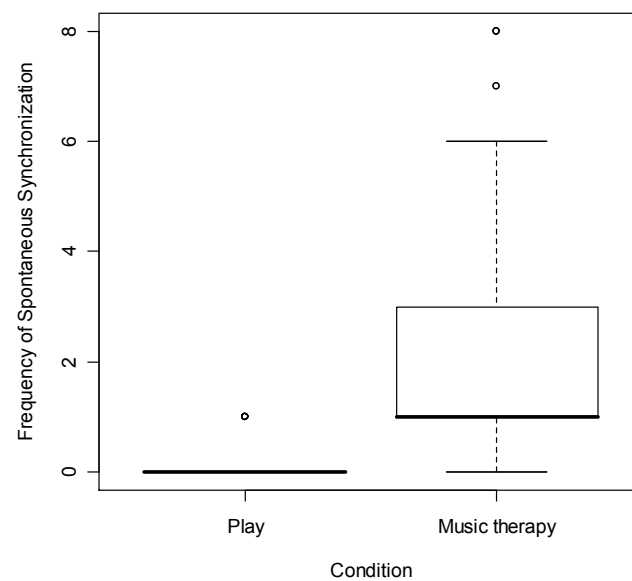
**Table 4.6. ANOVA table for the GLMM of frequency of spontaneous synchronization**

Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	141	49.08	***
Session part	1	141	1.54	0.21
Condition: Session part	1	141	0.36	0.54

\*\*\* $p < .001$

Table 4.6 presents the results of a repeated measures ANOVA on differences in frequency of spontaneous synchronization when comparing music therapy and play. There is a significant effect ( $p < .001$ ) of the *condition* variable, which indicates that the frequency of spontaneous synchronization is significantly greater in the music therapy than in the play condition. No significant effect was found for the independent variable *session part* or for the interaction of *condition* with *session part*.

Figure 4.5 depicts the results in a boxplot.



**Figure 4.5. Frequency of spontaneous synchronization by condition**

The boxplot for spontaneous synchronization (Figure 4.5) shows a marked difference between the music therapy condition and the play condition. As with spontaneous turn-taking, the median value in play is zero, while its value in music therapy is higher. Also, the box size and the extent of the whiskers are far greater in music therapy than in play. This result suggests that spontaneous synchronization occurred much more frequently in the music therapy than in the play condition.

#### 4.2.1.5 Duration of spontaneous synchronization

Table 4.7 presents the results of a repeated measures ANOVA on differences in duration of spontaneous synchronization when comparing music therapy and play.

**Table 4.7. ANOVA table for the GLMM of duration of spontaneous synchronization**

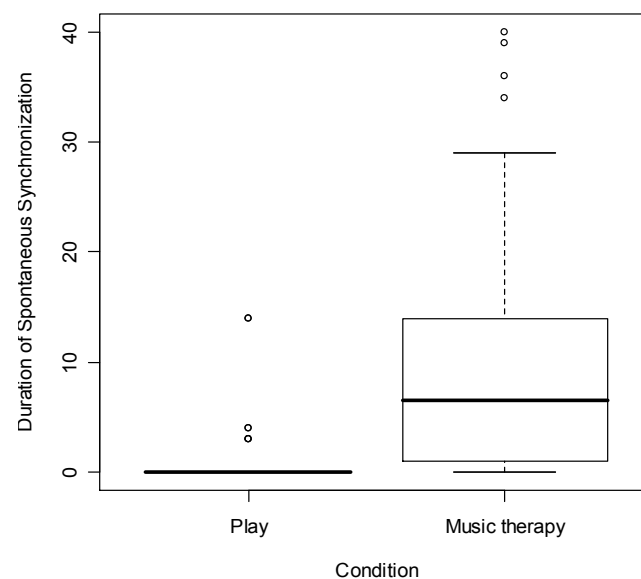
Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p- value
Condition	1	141	36.02	***
Session part	1	141	1.01	0.32
Condition x Session part	1	141	0.16	0.69

\*\*\* $p < .001$

There is a significant effect ( $p < .001$ ) of the *condition* variable, which indicates, as with frequency of spontaneous synchronization, that the duration of spontaneous synchronization was significantly longer in the music therapy than in the play condition.

No significant effect was found for *session part* or for the interaction of *condition* with *session part*.

Figure 4.6 depicts the results in a boxplot.



**Figure 4.6. Duration of spontaneous synchronization by condition**

The boxplot (Figure 4.6) shows a marked difference between the music therapy and play conditions for this variable, which means that music therapy was much more effective in facilitating longer duration of spontaneous synchronization than play.

#### 4.2.1.6 Duration of spontaneous turn-taking

Table 4.8 presents the results of a repeated measures ANOVA on differences in duration of spontaneous turn-taking when comparing music therapy and play.



**Table 4.8. ANOVA table for the GLMM of duration of spontaneous turn-taking**

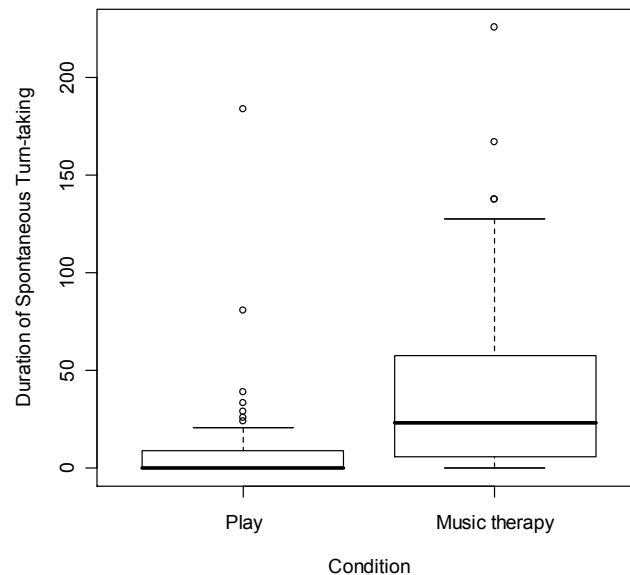
Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p- value
Condition	1	141	35.50	***
Session part	1	141	11.55	0.001
Condition x Session part	1	141	0.05	0.82

\*\*\* $p < .001$

A significant effect ( $p < .001$ ) was found for the *condition* variable, which indicates that there were significantly longer durations of spontaneous turn-taking in music therapy than in the play condition.

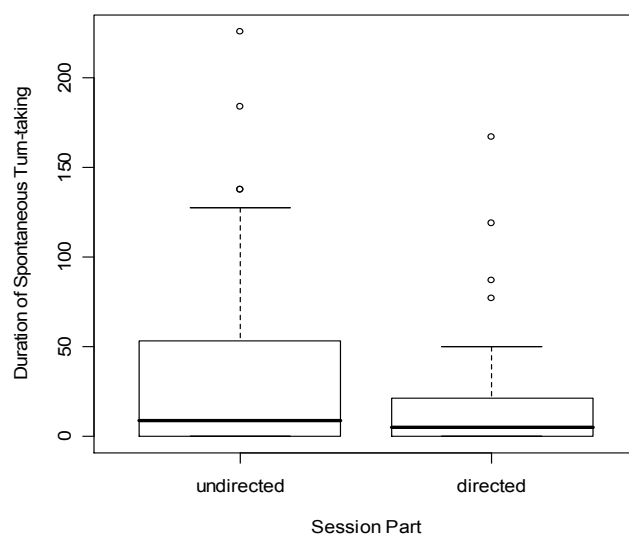
A significant effect was also found for the variable *session part* ( $p = .001$ ), which indicates that in the undirected part of the session (in music therapy and in play), there were longer durations of spontaneous turn-taking. No interaction effect was found for *condition* with *session part*.

Figures 4.7 and 4.8 depict the results in boxplots.

**Figure 4.7. Duration of spontaneous turn-taking by condition**

The above boxplot (Figure 4.7) illustrates that the box area of the music therapy condition is much greater than the box for play. In addition, the median value and the

extent of the whiskers also indicate that music therapy was much more effective in facilitating longer durations of spontaneous turn-taking than play.



**Figure 4.8. Duration of spontaneous turn-taking by session part**

The boxplot (Figure 4.8) illustrates that the box area of undirected session part is much greater than the box of the directed session part for spontaneous turn-taking. Although the two boxes start from the value of zero and the median has almost the same value, the box size and the extent of the whiskers indicate that the undirected session part (in music therapy and play) was much more effective in facilitating longer durations of spontaneous turn-taking than the directed part.

#### **4.2.1.7 Number of events of spontaneous turn-taking**

Table 4.9 presents the results of a repeated measures ANOVA on differences in the number of events of spontaneous turn-taking when comparing music therapy and play.

**Table 4.9. ANOVA table for the GLMM of number of events of spontaneous turn-taking**

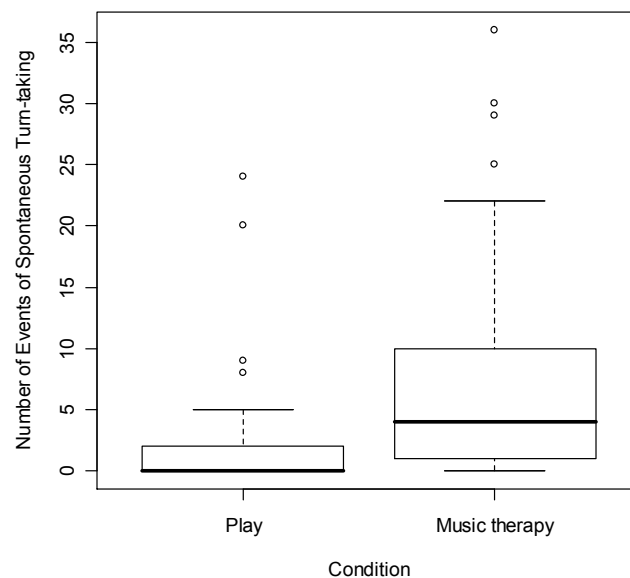
Variable	Numerator Degrees of Freedom	Denominator Degrees of Freedom	F-value	p-value
Condition	1	141	30.45	***
Session part	1	141	7.30	0.01
Condition x Session part	1	141	0.52	0.47

\*\*\* $p < .001$

There is a significant effect ( $p < .001$ ) of the *condition* variable, which indicates that the number of events of spontaneous turn-taking was significantly greater in the music therapy than in play.

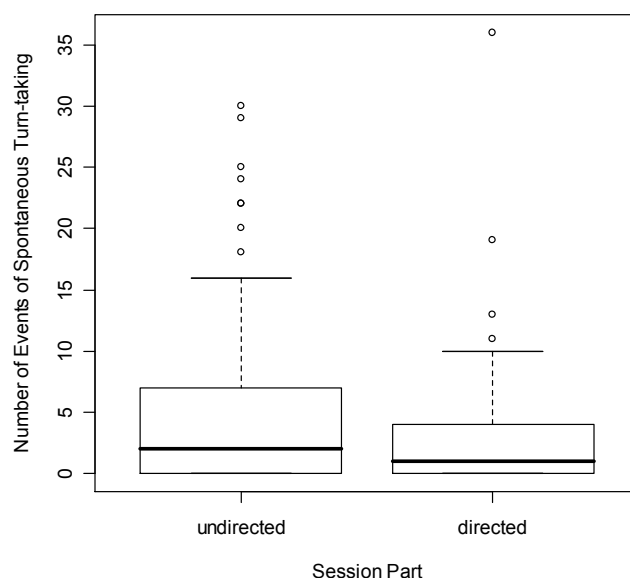
A significant effect ( $p = .01$ ) of *session part* variable indicates that in the undirected part of the session (in music therapy and in play), there were more events of spontaneous turn-taking. No interaction effect was found for *condition* with *session part*.

Figure 4.9 and 4.10 depict the results in boxplots.

**Figure 4.9. Number of events of spontaneous turn-taking by condition**

The above boxplot (Figure 4.9) illustrates that the box area of the music therapy condition is much greater than the box of the play condition. The median value and

the extent of the whiskers also indicate that music therapy was much more effective in facilitating many more events of spontaneous turn-taking than play.



**Figure 4.10. Number of events of spontaneous turn-taking by session part**

The boxplot (Figure 4.10) illustrates that the box area of undirected session part is much greater than the box of the directed part. Despite the fact that the two boxes start from the value of zero and the median in both boxes are similar, the box size and the extension of the whiskers indicate that the undirected session part for both music therapy and play was more effective in facilitating more events of spontaneous turn-taking than the directed part.

***In summary***, statistical analysis revealed a significant main effect ( $p < .001$ ) for *condition* for all seven dependent variables. There was a significant main effect for *session part* for frequency of spontaneous turn-taking ( $p < .05$ ), duration of turn-taking ( $p < .001$ ), and number of events of turn-taking ( $p < .01$ ), all favoring the undirected part of the session. There was no significant interaction of *condition* with *session part* for any of the variables.

#### 4.2.2 Supplementary analyses of parent questionnaires

As mentioned in section 3.4.2, each set of parents (5 pairs altogether) separately completed two questionnaires. Therefore, the results reported below refer to a possible 10 respondents in total. One questionnaire was completed before the research trials, and one at the conclusion of the trials. The purpose of these questionnaires was

to answer the following questions:

How does each parent describe the child's engagement in and enjoyment of music in daily experiences before and after the music therapy intervention?

*Sub-questions:*

1. Are there significant differences between the answers of the mothers compared to those of the fathers in the pre- and post-intervention questionnaires?
2. Are there common themes in the free-text answers of the mothers compared to those of the fathers, and what is their incidence?

The parents' responses in the questionnaires were given either on a Likert scale, and/or 'yes/no' questions. In addition, all the questions included free-text answers for the parents to add comments (see Table 3.5 and Appendix S).

Before presenting the analyses that were carried out to answer the above questions, an internal consistency analysis was computed for the three Likert-type sub-scales (questions 1, 2 and 7, respectively) which were:

- a. Responsiveness to music (which is heard via recordings or radio);
- b. Responsiveness to someone's playing;
- c. Responsiveness to someone's *singing*.

Cronbach's alpha was computed for each of these sub-scales and is presented in Table 4.10.

**Table 4.10. Cronbach alphas for parent pre-intervention questionnaire**

Sub-scale #	Name of sub-scale	Fathers	Mothers
1	Spontaneous responsiveness to music <sup>a</sup> (10 items)	0.90 (valid n=5)	0.37 (valid n=5)
2	Spontaneous responsiveness to live instrumental music (10 items)	not calculated (valid n=2)	not calculated (valid n=2)
3	Spontaneous responsiveness to live vocal music (9 items)	0.67 (valid n=4)	0.80 (valid n=4)

<sup>a</sup>Music that is heard via recordings or radio (*not* including TV or videos)

Table 4.10 shows that a high internal reliability of 0.9 was found for subscale 1, for the fathers, and a low one (0.37) for the mothers. Internal consistency for subscale 2 was unable to be computed because of the small n (2). A relatively high internal consistency of 0.80 was found for sub-scale 3 for the mothers, and a lower one of 0.67 was found for the same sub-scale, for the fathers.

An additional analysis of internal consistency was carried out in order to examine whether these three sub-scales can be combined to an overall scale. Computing Cronbach's alpha yielded no results due to too many missing data. These findings will be fully discussed in the discussion chapter.

Analyses of the quantitative and qualitative data were carried out on the pre- and post-intervention questionnaires, for the mothers and fathers, separately, in order to answer the above mentioned questions.

#### **4.2.2.1 Analysis of the quantitative data**

##### **4.2.2.1.1 Analysis of the Likert-type questions**

All the Likert- type questions (1, 2, 7, 8, 9, and 10) were analyzed using SPSS version 14.0 software. Paired sample t-tests showed no significant differences between the mothers' or the fathers' ratings from pre to post on the parent questionnaires (see sub-

question in section 2.4.2).

#### **4.2.2.1.2 Analysis of the ‘yes/no’ questions**

Questions 2, 3, 4, 5, 6, 9 and 11 included a ‘yes/no’ response from the parent. These answers were analyzed by using the R software. Fisher’s exact test found no significant differences between the ‘yes/no’ questions on the parent pre- and post-intervention questionnaires. These results indicate that despite the music therapy intervention, the difference between the mothers’ or the fathers’ responses from pre to post on the parent questionnaires was not significant (see sub-question in section 2.4.2).

#### **4.2.2.2 Analysis of the qualitative data (free-text answers)**

The results of the parent free-text answers on the pre- and post-intervention questionnaires are presented in Appendix S. The results include only the parents’ direct answers to those questions that requested free-text answers.

The responses given as ‘yes/no’ or the ones that were given on the Likert scales have already been analyzed (see sections 4.2.2.1.1~4.2.2.1.2). It should be emphasized that in many questions, parents were directed to a section where they could voluntarily offer information, but they were advised that this additional information was not obligatory. Consequently, a number of parents, who did not offer any free-text answers for many of these questions, could well have felt that they had already supplied as much of the required information as was necessary, or as much as was possible for them to recall through their ratings on the Likert scale and their answers of the ‘yes/no’ questions. Therefore, the responses need to be considered as additional material to the existing data of the Likert scale and the ‘yes/no’ questions.

Examination of the free-text answers on the questionnaires (pre and post-intervention, separately) revealed such diversity that it was very difficult to find areas of agreement or commonalities necessary to create categories. Examples of such comments can be found in questions 1-6. Despite this difficulty, there are some questions where similarities among the comments were more evident. Such comments will be presented below.

In **question 7**, the parents were asked whether they tried to sing to the child and if so, what songs they sang. Positive responses were given by 8/10 parents on the pre-

intervention questionnaire and some of them gave examples. All 10 parents responded post-intervention:

- Seven parents wrote that they sing children's songs to the child, as well as songs with movements.
- One father sings songs of a famous Israeli singer (whose songs were written for adults).
- One father wrote that he does not sing but his wife does.
- Another father wrote that he does not sing to the child.

For six parents there was no change in their attempt to sing children's songs to the child, after the music therapy intervention and the play sessions. Regarding the child's spontaneous response to the singing, only two parents added comments but these were very different from one another.

**Question 8** related to the parent's offer to the child of a CD or cassette tape with music to listen to. On both pre- and post-intervention questionnaires, 6/10 parents offered their child the opportunity to listen to a CD with music such as children's songs and Shabbat songs. This indicates no change in their behavior after the intervention. Four parents did not respond (pre and post).

Regarding the child's responses to the parent's offer:

- For three parents there has been no change in the child's response: On the pre- and post-intervention questionnaires they wrote that the child was happy and responded positively to their offer.
- One mother wrote (pre) that her daughter was sometimes happy, but lost interest rather quickly, while post-intervention she reported that she is not enthusiastic after a while.
- For two parents there has been a positive change in the child's response to the parent's offer post-intervention: One father wrote (pre) that his daughter did not respond, and after the sessions (post) that she responds positively; one mother wrote (pre) that when she offers the child a CD, it did not disturb him (i.e., it did not matter to him one way or another) and that after the sessions (post) her son wants to play the CD's by himself.

**Question 9** related to the child's use of sound games and toys. Comments were



varied. All 10 parents reported on the pre-intervention questionnaire that their child played with sound games and toys (including toy music instruments) but not all of them wrote whether the child enjoyed it. Post-intervention, nine parents responded with varied comments about the different games and toys, and one father did not respond.

In **question 10**, the parents were asked whether they tried to offer the child headphones to wear for listening to music. Only one father wrote on the pre-intervention questionnaire that his daughter took the headphones by herself and responded with hand movements, but post-intervention, he did not respond. Another father did not respond on the pre-intervention questionnaire but wrote (post) that with a CI it is impossible to wear headphones<sup>43</sup>.

In **question 11**, the parents were asked whether there is another member of the family besides them who provides the child with additional music experiences. Six parents responded (pre and post):

- Four of them reported that the grandmother was the person.
- One reported about the sister.
- One reported about an aunt.

Regarding the kind of musical experience, six parents wrote (pre) about singing as the additional experience, one of the six added dancing, and another one- reported using simple percussion and turning on the TV so that the child could hear music. In the post-intervention questionnaires, of the six parents who responded, five wrote about singing as the additional experience. One of the five also included offering small music instruments and the sixth wrote about playing the electronic keyboard as the additional experience.

Regarding **question 12**, the parents were asked to add further comments that might shed additional light on the child's musical behavior. Out of eight parents who responded post-intervention, only two parents responded pre-intervention:

- One mother wrote that her daughter loved music and she responded to music

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<sup>43</sup> There is actually no mechanical or electrical reason why a child (or adult) with a CI cannot use headphones, except that it would be clumsy to place it over the microphone of the CI. Today, all of the speech processor units have capability for an "external input" such as a CD-player or iPod or even a cable which plugs into a computer or stereo or TV, so there is really no need to use headphones. This may explain why almost all the parents never offered the child headphones for listening to music.

by clapping her hands and moving her body.

- Another mother wrote that her daughter enjoyed music for a longer period of time when it was accompanied by dances and joyful movements.

Post-intervention, eight parents responded:

- Six parents reported on the child's love for music, on the enjoyment from music and on the different responses to music such as dancing and singing.
- One father wrote that his daughter enjoyed the listening more but did not relate to music specifically.
- One mother said that since the research started, her son liked to make sounds everywhere.

**Question 13** related to the parents' expectations from the study. All parents responded:

- Eight of them wrote (pre) that they expected their child to love and enjoy music.
- One father hoped that this study would help his son discern sounds and that he would develop his own preferences in music.
- Similarly, the mother of the same child hoped that music therapy would encourage her son to listen to music, to know his musical preferences, and that it would contribute to his hearing.

Post-intervention, all parents responded to question 13:

- Seven parents wrote that their expectations were fulfilled.
- Two fathers wrote that only part of their expectations was fulfilled.
- One mother wrote that she is not fully sure whether her daughter's additional liking for music is due to the music therapy sessions or to the improvement in her hearing.

Due to the difficulties caused by the many previously mentioned individual differences in the parents' comments, rather than summarizing and categorizing the comments (i.e., the free-text answers), section 4.2.4 will present a case study narrative on each child. The parent's comments as well as other information from the parent

interviews will be included so that the reader will be able to gain a deeper understanding and perspective of each parent's perception of their child.

### **4.2.3 Supplementary qualitative analysis of parent interviews**

#### **4.2.3.1 Thematic analysis**

The transcribed parent interviews (in Hebrew and in English) appear in Appendix M.

As explained in section 3.8.3.3, seven parents (4 mothers and 3 fathers) watched short video clips from the music therapy intervention, and were then interviewed, separately, by the clinical social worker from 'Shemaya'. The interviews were carried out in order to answer the following question:

What are each parent's reflections and thoughts in relation to the child's participation in music therapy after watching short video clips from the music therapy intervention?

*Sub-questions* were:

1. Are there certain common themes that emerge and can be identified in the interviews held separately with mothers and fathers?
2. Are there quantitative and qualitative differences between the themes that appear in the mothers' interviews compared to the fathers' interviews?

In order to answer the first sub-question, the interviews were transcribed (see Appendix M), translated to English, and a thematic analysis was carried out by categorizing the parents' responses to main and sub-themes. The procedure is detailed in section 3.9.3.2. As mentioned in that section, all sub-themes, whether recurring or appearing only once, were written down, since each held kernels of relevant and important information. Table 4.11 presents these themes.

To answer the second sub-question regarding the frequency of the common themes in the free-text answers of the mothers and the fathers (separately), each sub-theme was counted in all fathers' interviews as well as in the mothers'. The total frequency for each theme, for both parents, is displayed in brackets (indicated by 'N'), and followed by its frequency in the fathers' interviews and then- in the mothers' ('f' for fathers; 'm' for mothers). Table 4.12 presents the themes' frequency from the most common to the least common one.

**Table 4.11. Parent interviews: Themes, sub-themes and their frequency****1. Child's emotional coping abilities:**

- (a) How child copes with challenges (N=2) (f=1; m=1)
- (b) Child's self-assertion or need for control (N=19) (f=4; m=15)

**2. Child's cognitive abilities:**

- (a) Child's ability to make connections and generalize (N=7) (f=4; m=3)

**3. Parent's attitude towards the child:**

- (a) Pride/satisfaction/joy regarding child's behavior/abilities (N=27) (f=7; m=20)
- (b) Parent's empathy with or compassion for child (N=6) (f=1; m=5)
- (c) Parent's perception of how child resembles him/her (N=1) (f=1; m=0)
- (d) Disappointment/reservation/criticism of child's behavior (N=12) (f=5; m=7)
- (e) Acknowledgment of child's abilities (N=8) (f=1; m=7)

**4. Parent's attitude towards music therapy intervention:**

- (a) Parental initial response to participating in research (N=2) (f=0; m=2)
- (b) Benefit of music therapy for child (N=24) (f=8; m=16)
- (c) Benefit of music therapy for parent (N=5) (f=2; m=3)
- (d) Investment of money for music equipment and supplies (N=1) (f=0; m=1)

**5. Child's music experiences:**

- (a) Music experiences by parent and/or child since the implantation (*prior* to research/during music therapy intervention) (N=3) (f=0; m=3)
- (b) A comparison between child's experiences during music therapy and child's experiences before music therapy intervention (N=1) (f=0; m=1)
- (c) A comparison between child's experiences during music therapy and child's present music experiences in daily life (N=21) (f=5; m=16)
- (d) Application of musical interactions by the parent in child's daily life (N=8) (f=3; m=5)

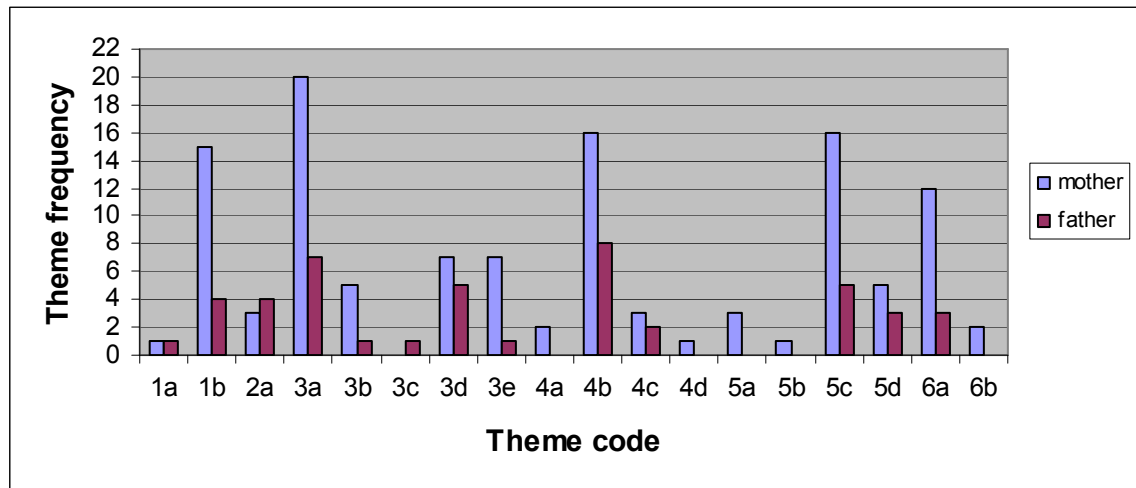
**6. Child's non-musical behaviors:**

- (a) A comparison between child's non-musical behavior during music therapy intervention to child's behavior in daily life (N=15) (f=3; m=12)
- (b) Application of therapist's behaviors by the parent in child's daily life (N=2) (f=0; m=2)

**Table 4.12. Themes in order of frequency**

Sub-theme code	Sub-theme	Total freq.	Theme's freq. for mothers	Theme's freq. for fathers
3a	Pride/satisfaction/joy regarding child's behavior/abilities	27	20	7
4b	Benefit of music therapy for child	24	16	8
5c	A comparison between child's experiences during music therapy and child's <i>present</i> music experiences in daily life	21	16	5
1b	Child's self assertion or need for control	19	15	4
6a	A comparison between child's non-musical behavior during music therapy intervention to child's behavior in daily life	15	12	3
3d	Disappointment/reservation/criticism of child's behavior	12	7	5
3e	Acknowledgment of child's abilities	8	7	1
5d	Application of musical interactions by the parent in child's daily life	8	5	3
2a	Child's ability to make connections and generalize	7	3	4
3b	Parent's empathy with or compassion for child	6	5	1
4c	Benefit of music therapy for parent	5	3	2
5a	Music experiences by parent and/or child since the implantation ( <i>prior</i> to research/during music therapy intervention)	3	3	0
6b	Application of therapist's behaviors by the parent in child's daily life	2	2	0
4a	Parental initial response to participating in research	2	2	0
1a	How child copes with challenges	2	1	1
3c	Parent's perception of how child resembles him/her	1	0	1
4d	Investment of money for music equipment and supplies	1	1	0
5b	A comparison between child's experiences during music therapy and child's experiences <i>before</i> music therapy intervention	1	1	0

Figure 4.11 presents these frequencies as clustered columns, which compare the themes' frequency across the themes.



**Figure 4.11. Parent interviews: Frequency of themes**

Each theme will now be re-stated and followed by two relevant examples quoted from the interviews, one given by a father and one by a mother (if two examples exist). Some of the examples may be clearer and better understood within the context of the whole interview which can be found in Appendix M.

### 1. Child's emotional coping abilities:

- (a) How child copes with challenges (N=2; f=1; m=1)

*Af's mother:* "The part with the cymbal. There was something about the way he is, that he goes along with all his strength. This is Af, in this part".

*Af's father:* "When one presents him with an initial challenge he jumps right in and immediately tries to cope with it and one could see it there"...

- (b) Child's self-assertion or need for control (N=19; f=4; m=15)

*Af's mother:* "I expected him more to take over, because usually when there are things he likes, he wants to have control. "I am here and I decide", like with the cymbal, I saw that he was enjoying it so he took over and said: it will be like this. Although he did participate with Dikla but he took over more".

*O's father:* "Yes. She was sure that when she wants the stick – she gets it. It can't go to someone else".

## 2. Child's cognitive abilities:

- (a) Child's ability to make connections and generalize (N=7; f=4; m=3)

*O's mother:* "I don't know... the connection of...that she understood and connected among all the things around".

*Ay's father:* "I remember that at the time Dikla was working with her, suddenly at home she took notice of different kinds of sounds and this was due to the fact that Dikla worked with her on that".

## 3. Parent's attitude towards the child:

- (a) Pride/satisfaction/joy regarding child's behavior/abilities (N=27; f=7; m=20)

*Ay's mother:* "Ay not only manages in life but she has fun doing it... it's not only the fact that she is getting along, but she gets along with her handicap... She wouldn't miss anything because of this handicap".

*Af's father:* "This week he took a microphone and started to sing. Really, he started to shout".

- (b) Parent's empathy with or compassion for child (N=6; f=1; m=5).

*Af's mother:* "The part that was less – with the electronic organ, I don't know, he was involved, not involved. Well, you see, it depends also sometimes on how he got up in the morning, how he behaves on the same day, it changes sometimes".

*O's father:* "...how can I explain, as one who knows O, she can talk her head off without any connection, but even this was nice".

- (c) Parent's perception of how child resembles him/her (N=1; f=1; m=0).

*Af's father:* "When one presents him with an initial challenge he jumps right in and immediately tries to cope with it and one could see it there. This, I know, characterizes me".

- (d) Disappointment/reservation/criticism of child's behavior (N=12; f=5; m=7).

*Af's mother:* "... when he less went along with things. The sixth session, when he made this sound with his voice, was nice, but he was less himself, he was more passive".

*Interviewer:* "Yes? You felt it was not really him"?

*Mother:* "Yes".

*Interviewer:* "What moment or part of a session did you like the least"?

*Af's father*: "I think – the 6th part. In the 6th part I could see that he was kind of unclear about what he wanted to do. He was not...He was not focused on anything".

- (e) Acknowledgment of child's abilities (N=8; f=1; m=7).

*C's mother*: "... Just like that, one sees all the communication, the understanding".

*Ay's father*: "It's good when every person insists on his opinion. Of course she imitated Dikla, so it's important that she can insist on her opinion".

#### 4. Parent's attitude towards music therapy intervention:

- (a) Parental initial response to participating in research (N=2; f=0; m=2)

*O's mother*: "No, it was cool, and from the beginning, in the beginning I wasn't very anxious but then you say to yourself, what you are getting into; maybe you don't need this mess".

- (b) Benefit of music therapy for child (N=24; f=8; m=16)

*Ay's mother*: "There are no... There are no words... People always say that music for children with HI is difficult in a way, because let's say that they hear and do not always know to dance according to the rhythm, but here Dikla made Ay learn it... She learned to hear the rhythm precisely...All the little points... All the... In a very exact way. A thing that... It's fantastic how it will add to her life and it's for all her life because it was done in such a young age".

*O's father*: "...kind of you can see that she hears, she reacts to the hearing, that she relates to the things she hears, that there is more connection to hearing; everything is beautiful".

- (c) Benefit of music therapy for parent (N=5; f=2; m=3)

*Af's mother*: "But really, no doubt about it, I think this gave us a lot".

*Interviewer*: "What you are actually saying is – It brought to my awareness the importance of making him listen to different kinds of sounds".

*Af's father*: "I am sure... 100% sure that it is important".

- (d) Investment of money for music equipment and supplies (N=1; f=0; m=1)

*Af's mother*: "But it made me see how much he likes playing instruments and how much I would like to invest in this area of playing for him, buy him



more instruments, more serious, so that he enjoys it more, because I see he enjoys the drums particularly”.

## 5. Child’s music experiences:

- (a) Music experiences by parent and/or child since the implantation, implantation (*prior* to research/during music therapy intervention) (N=3; f=0; m=3)

*Af’s mother*: “At home too I see he is constantly looking where to hear sounds from. He even throws things, tosses them, just to hear the sounds”.

- (b) A comparison between child’s experiences during music therapy and child’s experiences *before* music therapy intervention (N=1; f=0; m=1)

*Interviewer*: “While watching the videotapes, did you have any thoughts/memories about your child’s **similar** reactions at home? Please explain”.

*Af’s mother*: “Yes, yes, a lot. With all the video clips. We also have at home music instruments, not real ones but still, he seemed to like them very much”.

- (c) A comparison between child’s experiences during music therapy and child’s *present* music experiences in daily life (N=21; f=5; m=16)

*O’s father*: “Yes, the parts with the music that she copies the sound. The first part of playing to her sounds and she will identify them in the area. The same when she made her hear the dog and she looked for the dog’s picture or something close. You can do more with her about this. The truth is that at home we don’t work with her so much on these things. We try more speech, you know, but yes, apparently it is a better idea”.

*O’s mother*: “This whole issue of music at home is not something we reinforce, so maybe in this area we can give her more music instruments to try and play and see what she’ll do, i.e., without guiding her, to give her and see how she will respond. In addition, at our home music is something that is not really...”

- (d) Application of musical interactions by the parent in child’s daily life (N=8; f=3; m=5)

*Af's mother:* "It gave me new ways about how to play more with him, how to get him more involved, although we do play with him a lot, but it is still a pleasure to see him".

*Af's father:* "What I want to say is that we will try... I, at least, will try to make more sounds for him and I will try to see if he, like he did in the video clips, gets more interested and is more quiet and really listens".

## 6. Child's non-musical behaviors:

- (a) A comparison between child's non-musical behavior during music therapy intervention to child's behavior in daily life (N=15; f=3; m=12)

*Ay's mother:* "Maybe it's a repetition, but I enjoyed it very much the way Dikla,...with all the patience... Maybe it's what I said before, that I didn't succeed to sit with Ay and have a conversation... Because usually I would initiate things at home, not her. And this is... as if... patience. Dikla waits until Ay will do... One can see here- until Ay didn't completely finish, Dikla didn't start. There was one time where Ay said to her: "Not you" but during the process you see that Dikla she waits and allows her to do it. It was superior".

*O's father:* "At home she was getting much more angry if we would try to do these things with her".

*Interviewer:* Less patient?

*O's father:* "Less patient and she wouldn't let us do it... But here she seems more relaxed..."

- (b) Application of therapist's behaviors by the parent in child's daily life (N=2; f=0; m=2)

*Ay's mother:* "The fact that Dikla gave in the beginning... To tell you the truth, that was all the way through. That Ay will do first. Usually, as a mother, I am the one who decides more what we'll do. OK, now we'll sit down and draw. Or- Let's sit down and you will do, you will be the spinning-top and I...As if to give her the... The truth is that yesterday I did exactly this and I saw- it was really cool. I didn't have the energy to be the one who gives the direction at home. I was sitting on the sofa and doing nothing, and the children directed me and it was very nice. So here I saw it

more, that it's possible to do it many times. So it won't be exactly as I want now..."

#### 4.2.3.2 Comparison of fathers' and mothers' responses

Although this thematic analysis was not originally intended to be a quantitative analysis, one cannot ignore the fact that it shows some significant percentages in certain areas: Theme 3a (pride/satisfactory/joy regarding child's behavior/abilities) might be expected (total frequency=27), but what is encouraging for this study is the high frequencies for themes 4b (benefit of music therapy for child), 5c (a comparison between child's experiences during music therapy and child's *present* music experiences in daily life), and 6a (a comparison between child's non-musical behavior during music therapy intervention to child's behavior in daily life), which were 24, 21 and 15, respectively, primarily by the mothers. In addition, it seems evident from the number of contributed themes by fathers and mothers, that the mothers contributed significantly more comments and therefore generated more themes than the fathers. Theme 1b (child's self-assertion or need for control) is another example where there were a lot more themes coming from the mothers (15 for the mothers vs. 4 for the fathers).

In themes 1a (how child copes with challenges), 2a (child's ability to make connections and generalize), 3d (disappointment/reservation/criticism of child's behavior), 4c (the benefit of music therapy for parent) and 5d (application of musical interactions by the parent in the child's daily life) there is no clear difference in frequencies between the mothers and the fathers.

Theme 3c (the parent's perception of how child resembles him/her) appeared only once in an interview of one father.

Themes 4a (parental initial response to participating in research), 4d (investment of money for music equipment and supplies), 5a (music experiences shared by parent and child, and/or those of the child alone since the implantation [*prior* to research/during music therapy intervention]), 5b (a comparison between child's experiences during music therapy and child's experiences *before* music therapy intervention) and 6b (application of therapist's behaviors by the parent in child's daily life) appeared only in the mothers' interviews.

These findings will be further examined in the Discussion chapter.

#### 4.2.4 Case study narratives

As previously mentioned (see section 4.2.2.2), due to the difficulties caused by the many individual differences in the parents' comments (i.e., the free-txt answers), a case study narrative on each child will be presented in sections 4.2.4.1~ 4.2.4.5 rather than summarizing and categorizing the comments. Thus, the reader will be able to gain a deeper understanding and perspective of each parent's perception of their child. Each case study narrative is based on the parent's comments as well as the information from the parent interviews after they had watched short video segments from the music therapy sessions.

The parent free-text answers in the questionnaires and the interview material were translated literally. Therefore, the reader may have some difficulty understanding specific idioms or comments made by the parent.

##### 4.2.4.1 Case study narrative: Z

***Pre-research trials- Narrative of Z's Mother<sup>44</sup>:*** Z usually responded to music heard on cassette tapes, radio or CD's mainly when Z herself initiated the listening activity and decided when to terminate it. At that time, there were no musical instruments at home. Z liked to listen to a video cassette named "Baby Smart" and to sounds from a special book and some of her sound making toys. Music from sources other than TV did not hold her interest for a long time. She enjoyed music for a longer period of time when it was accompanied by dances and joyful movements (on a video cassette). Z's mother did not know whether Z disliked certain musical sounds or styles of music. A quiet listening environment and mainly video cassettes (music and movie clips), usually in the afternoons, enhanced her musical enjoyment. She used to ignore music that she did not like. Since the implantation, Z's mother has been singing children's songs for Z and she responds with sign language that she learned in her kindergarten. Both parents also played for her audio cassettes of Shabbat and familiar birthday songs recorded in her kindergarten. She sometimes responded happily but lost interest in it quite quickly. Z's aunt provided her with additional music experiences and used

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<sup>44</sup> Z completed only 11 sessions out of 16. Of these, only 4 sessions were music therapy; Z's mother attended all 11 sessions except for unusual circumstances; Both parents refused to be interviewed. Therefore, this summary is based *solely* on the free text answers of the pre- and post-intervention questionnaires.

to sing and dance with her, along with accompaniment on a tape. Z always responded happily to these experiences.

Both parents' expectations were that Z would enjoy music.

***Post-research trials- Narrative of Z's mother:*** Usually after listening to music for a while, Z asks that the music be turned off. The parents purchased an electronic keyboard for her. Usually in the afternoons, she randomly plays it, turns it on and off and presses the buttons to have background music. She used to play with the keyboard more when it was new. She does not have any specific musical preferences and does not like to listen to songs in languages other than Hebrew. When she hears such songs on the radio, she asks that the radio be turned off. In addition, she does not like music that is unfamiliar to her either on the radio or on video cassettes.

Both parents encourage her to listen to familiar children's songs and to a video/DVD with other songs, the latter being her main enjoyment. She loses her enthusiasm after a relatively short time. Sometimes she plays with toys that have bells inside them. She loves musical toys, something she could not enjoy prior to the cochlear implantation.

Her aunts (in the presence of her parents) continue providing her with additional music experiences. They play with her on the electronic keyboard and she always responds happily.

Z's mother claims that she was not fully sure whether Z's additional liking for music is due to the research or to the improvement in her hearing.

***Pre-research trials- Narrative of Z's father:*** Z's father wrote that in his opinion, Z did not listen to music at all. Therefore, he did not know about any particular types of music activities or listening situations that enhanced Z's musical enjoyment or caused lack of enjoyment for her. Z's father used to sing children's songs for Z before the research trials commenced. Both parents also played audio cassettes of Shabbat and birthday songs recorded in Z's kindergarten. Z did not respond to these songs. She liked playing with a children's book that made sounds according to the buttons she pushed. There was no other person in the family who provided her with additional music experiences.

Both parents' expectations were that Z would enjoy music.

**Post-research trials- Narrative of Z's father:** Both parents indicated that Z has no specific musical preferences and that they encourage Z to listen to children's songs and to a DVD with other songs. Z responds positively to that. However, Z hardly responds spontaneously to music heard on cassette tapes, radio or CD's. The parents bought an electronic keyboard and Z likes to play with it. There are no particular musical sounds or styles of music that enhance Z's musical enjoyment. Z likes to play the toy guitar in the kindergarten. Z's father stopped singing songs to Z but did not elaborate on this.

Z's father appeared to express his partial satisfaction by writing that his expectations were not fulfilled enough.

#### **4.2.4.2 Case study narrative: Af**

**Pre-research trials- Narrative of Af's Mother:** Af's mother<sup>45</sup> immediately agreed to her child's participation in the study, hoping that it would help him. Both parents used a CD player to play children's songs for Af. Af used to respond to music by clapping his hands while the other family members were dancing and clapping. Sometimes he danced with them as well. He also used to point at the CD player so that his mother would turn it on for him. He liked listening to children's songs and action songs. At home there are different kinds of bells, maracas and a small toy drum. He used to beat the small toy drum and knock on every object at home in order to hear the sounds. When given a microphone, he was afraid to hear himself on the loudspeaker and refused to sing or speak into the microphone. Af's sister, whom he is very attached to, was another member of the family who provided him with an additional musical experience. She used to sing songs for him. Af usually enjoyed it, showed it by smiling and sometimes wanted to control the situation.

Af's mother expected that music therapy would encourage Af to listen to music, present him with different timbres of music, help develop his hearing more and that Af would know how to direct the parents to his musical preferences.

**Post-research trials- Narrative of Af's mother:** Both parents used a CD player to play children's songs for Af. He likes songs much more than he used to prior to the pre-research trials. Af plays with a duck which produces melodies, likes to knock on

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<sup>45</sup> Af's mother did not attend any of the sessions.

the floor with sticks and bottles, and to throw and toss things, just to hear the sounds. The parents had had purchased a much bigger toy drum for him.

Today, Af really wants to sing or speak into the microphone and also sings along with the song that he is listening to. Though he has toy musical instruments, he particularly enjoys playing the 'real' drums that belong to his neighbor's son. He gets very enthusiastic about it. Af's mother offers to play musical instruments with him and to sing children's songs from his kindergarten. He usually enjoys it and sometimes wants to control the situation.

Af goes along with all his strength, is very assertive and needs to take control, especially when he likes to do something specific. Both parents expressed their pride and happiness about this aspect of his personality. What Af's mother saw on the video gave her new ideas about how to play more with him and get him more involved. She described how sensitive Af is regarding people's feelings. She was somewhat distressed on seeing in one of the video examples that Af was less involved in the activity but she expressed her empathy for him. Both parents were less pleased with the video clips where Af was not focused, less involved, more passive and quieter.

She said that many of her expectations regarding this study were fulfilled because Af loves music and feels connected to music. He prefers listening to specific songs, likes to play musical instruments and likes to hear himself through the loudspeaker, something he refused to do pre-research trials. Af's mother greatly enjoyed the video examples that she watched and thinks that music therapy contributed a lot to her and her husband. Both parents are willing to apply music experiences that they saw in the video examples. Af's mother wants to invest in buying 'real' musical instruments because she is aware to the great enjoyment and enthusiasm that Af has from playing them, especially the drums.

***Pre-research trials- Narrative of Af's father:*** Af's father was reluctant about Af's participation in the study at the beginning because he did not believe it would help him, but then he complied with the mother. Af's mother did not indicate whether this was prior to or after the first session.

Af did not have any special preferences for music. Sometime, when the parents listened to music and danced, Af used to join them. Af liked to play with a toy police car that has a siren. Af's father used to sing children's songs for Af from time to time. In general, competing noise made music less enjoyable for him.

Af's father's expectations prior to the start of this study were that music therapy would help Af to discern sounds and that Af would have his preferences in music.

**Post-research trials- Narrative of Af's father:** Af now likes to play with the electronic keyboard that includes animal sounds. Af reminds the father of himself because when Af is presented with an initial challenge, he immediately tries to cope with it. Af's father also pointed out that Af was much more attentive in the video examples than he is at home. Both parents expressed their pride and happiness about the fact that Af goes along with all his strength, that he is assertive and needs to take control, especially when he likes to do something specific. Af's father indicates that everything one invests in Af is good for him.

Af immediately perceives a story that is read to him, exactly as he knew how to point to the right picture when songs were played for him in the music therapy sessions. Both parents were less pleased with the video clips where Af was not focused, less involved, more passive and quieter.

The expectations of Af's father regarding this study were partly fulfilled and he claimed that Af still needs to work more on discrimination of sounds because it is not something that he has fully mastered. Both parents are willing to apply music experiences that they saw in the video examples. Af's father said that what he saw brought to his awareness the importance of encouraging Af to listen to different kinds of sounds. Both parents acknowledge the great importance of music therapy for Af.

#### **4.2.4.3 Case study narrative: Ay**

**Pre-research trials- Narrative of Ay's mother<sup>46</sup>:** When one of the parents turned on the tape recorder, Ay used to ask them to come and dance with her. There is an electronic keyboard at home and Ay liked to play it by pressing down the keys and swaying from side to side. She always enjoyed playing with sound toys. She has a toy telephone that plays and a toy xylophone that she liked very much to play with.

Ay's mother hardly made any comments to the free-text answers since many of her answers to the questions in the pre-intervention questionnaire were negative.

Her expectations prior to the commencement of the study were that Ay would like music and enjoy participating in music therapy.

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<sup>46</sup> Ay's mother attended all 16 sessions except for unusual circumstances.



***Post-research trials- Narrative of Ay's mother:*** When Ay hears music at home, she sometimes moves her body as if she is playing the electronic keyboard while simultaneously moving her mouth. Sometimes, she asks her parents to come and dance with her. When she plays the electronic keyboard, she moves her head to the left and to the right, smiles and tries to sing. When her older sister plays the electronic keyboard, she tries to sing by mouthing “la, la, la”. She greatly enjoys playing with other toys that make sounds and one of which also has lights. During the research period, the parents purchased a toy drum and a toy xylophone. Ay’s mother indicates that Ay likes melodies very much and is becoming increasingly interested in them.

After attending all of the music therapy sessions, Ay's mother currently sings songs accompanied with movements for Ay. She did not elaborate on Ay’s response to her singing.

Both parents acknowledge Ay’s assertiveness and need to control. Ay’s mother said these needs were manifested throughout the research period as well as at home. She is happy about the fact that Ay has her own opinion though she sometimes has difficulty coping with this. She understands that at times, she has to give up the way she thinks things should be done, and give Ay the opportunity to decide and control the situation. She said that as much as Ay likes to be in control, she is quite able to compromise and to do things together.

Ay’s mother indicated that due to the music therapy, Ay has become more attentive to different sounds in her environment and her auditory perception has improved.

Ay’s mother makes a comparison between Ay’s behavior during music therapy and her behavior at home. She is very proud of the fact that Ay did not want to miss even one moment in music therapy. She added that also at home, Ay does not want to miss a thing because of her handicap and that she manages very well despite her hearing impairment.

Ay’s mother admitted that she has not succeeded in convincing Ay to cooperate with her to work on her speech therapy at home, but that Ay has agreed to cooperate with the music therapist during the music therapy sessions. She enjoyed the fact that Ay freely communicated by vocalizing, and added that at home she had never thought of trying such a vocalized conversation. She indicated that Ay always has to do things “up to the end”, which means that Ay always has to complete the things she is doing.

She also greatly enjoyed the patient behavior of the music therapist towards Ay, and learned a lot from that.

Post-research, Ay's mother said that her expectations were fulfilled. She referred to the fact that people think that music for children with hearing impairments is difficult in a way and that generally, they do not like music, but she asserted that due to music therapy, Ay learned to respond to the rhythms of each song in a precise manner, and that music therapy will add a great deal to her life because she received it at such a young age. She also added that Ay's love for music is something very extraordinary and expressed her very deep appreciation of music therapy and the music therapist.

***Pre-research trials- Narrative of Ay's father:*** Ay enjoyed making sounds by banging on a toy, like playing a drum. She liked relatively "louder music, not soft". Ay's father did not try to offer her any music for listening. She used to point to the tape recorder and make movements of a dance, and hand movements as if she is playing an instrument, and she does "la la la" with her mouth. Ay's father never tried to sing songs for her. He noted that Ay has neither preference nor dislike for certain musical sounds or music.

The expectations of Ay's father from the study were that Ay would enjoy the experience, learn to listen to all the sounds of music, and be able to tell him and his wife what tape or what kind of music she wants.

***Post-research trials- Narrative of Ay's father:*** Ay plays the xylophone almost every time she sees it. She also plays with other toys that make sounds and one that also has lights. She greatly enjoys playing with the toys. Sometimes she takes her father to where the tape recorder is, asks him to pick her up so that she can turn it on, and then starts to dance.

Both parents acknowledge Ay's assertiveness and need to control. Ay's father indicated her learning ability that manifests itself in her ability to make connections and generalize.

Ay's father did not answer most of the interview questions and therefore, the material from the father's interview is very meager.

According to what Ay's father saw in the videotapes and/or at home, he said that Ay definitely improved in her ability to listen, to be aware of many different sounds

and to respond to them, but added that she does not yet express her musical preference for listening because she still does not know how to tell her parents what music she wants to hear. He noted that as parents, they greatly enjoyed music therapy and talked about his willingness to apply what he saw in the video clips.

#### **4.2.4.4. Case study narrative: C**

***Pre-research- Narrative of C's mother<sup>47</sup>:*** At home, C enjoyed playing with the musical toys. She has a drum, a harmonica, a ball with bells inside, and a pair of maracas. C enjoyed listening to music cassettes played on a tape recorder and to songs that her mother sang for her. She also tried to turn on the tape recorder at home in order to hear music. According to both parents, C enjoyed music that was played at a relatively low volume. When the volume is increased, she removes the external part of the cochlear implant system. Since the implantation, prior to the clinical trials, and then throughout the research period, C's parents as well as her grandmother sang familiar children's songs for C. They also encouraged her to listen to children's songs on a tape. She greatly enjoyed listening to these songs.

C's mother hoped that C would enjoy experiences she has never had before.

***Post-research: Narrative of C's mother:*** Post-research, there has been no change in the use of sound games and toys by C when compared to her use before the research trials commenced. She enjoys playing with them. She likes to listen to the electronic keyboard at her aunt's house and to cassettes of Hassidic music<sup>48</sup>. Both parents wrote about C's love of Hassidic music. C enjoys music that is played at a relatively low volume. Loud noise disturbs her. C always came happily to the sessions and greatly enjoyed the experiences with the musical instruments as well as the other music experiences. She also tried to turn on the tape recorder at home in order to hear music, as she did in the music therapy sessions. During the research period, C's mother asked the principal of C's kindergarten to purchase musical instruments for the children as a result of C's enjoyment. C's mother tries to apply the music

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<sup>47</sup> C's mother attended all 16 sessions;

On the grounds of religious constraints, C's father declined to watch the video clips due to the fact that the therapist was a woman. As a result, he could not be interviewed. Therefore, this summary is based on C's mother's interview as well as the free text answers of both parents in the parents' pre- and post- research questionnaires.

<sup>48</sup> This is the music that the parents often listen to at home.

experiences she saw during the sessions to C's daily life, e.g., singing a song for C while C looks for the associated picture. C's mother is proud that C applies at home what she has learned during the music therapy sessions. She keeps repeating some of the music experiences, and that appears to help her internalize what she learned. C's mother emphasized the fact that C's speech is improving as well as her understanding. She was excited about the communication that took place between the music therapist and C during the research period. C greatly enjoyed the music therapy sessions.

C's mother acknowledges the importance of music therapy and its contribution for C.

***Pre-research- Narrative of C's father:*** C responded to music heard on cassette tapes, radio or CD's. She liked to bring a CD or a cassette tape to her father for listening. According to both parents, C enjoyed music that is played at a relatively low volume. When the volume was increased, she removed the external part of the cochlear implant system. C's parents as well as her grandmother sang children's songs for C and she responded and enjoyed that. They also encouraged her to listen to children's songs on a tape and she greatly enjoyed listening to these songs. C enjoyed playing with musical games and toys such as a drum, a harmonica, a ball with bells, and a pair of maracas. Sometimes she took headphones for listening and responded to the music by hand movements. Her grandmother used to sing children's songs to her and she responded positively.

C's father had no specific expectations but he hoped that C would enjoy the music therapy sessions.

***Post-research- Narrative of C's father:*** No new musical instruments have been purchased since the research trials commenced. C loves playing the electronic keyboard at her aunt's home. Both parents wrote about C's love of Hassidic music. She likes listening to music at a low volume and noise disturbs her. C's father sings children's songs for her and she responds positively. When C's father offers her cassette tapes or CD's with children's songs for listening, she comes and listens. She enjoys playing with musical toys and games. Her grandmother is the person who provides her with singing experiences and she is happy to listen. She enjoys her hearing ability more now.

Post-research, C's father expressed his satisfaction with the fact that his expectations were fulfilled.

#### **4.2.4.5 Case study narrative: O**

**Pre-research trials- Narrative of O's mother:** O's mother<sup>49</sup> shared her 'fear' regarding O's participation in the study, but finally she agreed. At home, usually when O heard music or someone singing, she greatly enjoyed performing a dance and clapping hands. In addition, she enjoyed playing a toy drum and a xylophone that the family has at home. She had no special preferences for specific musical sounds, styles of music or certain volumes that she liked to listen to but she used to point at the CD player so that her mother would turn it on. From time to time, O's mother used to sing children songs for her or offer her children's songs to listen to. O's grandmother was accustomed to singing songs for her, playing simple musical instruments, and putting on music for her, as well as turning on the TV for her to listen to. O joyfully responded to these experiences.

The expectations of O's mother were that O would enjoy the music therapy sessions and that it would succeed. She added that if the study would help other children with CI- she would be glad.

**Post-research trials- Narrative of O's mother:** O's mother continues singing children's songs for O or offering her CD's of similar songs. O wants to listen to them. Both parents talked about O's need to be in control, which manifests itself at home as well as in music therapy. For example, if she takes something in her hands, such as drumsticks, she won't give them to anyone and she will also determine what will be done with them.

Both parents spoke about O's ability to connect with all the things that she hears in her environment. O's mother emphasized O's ability to observe another person's specific action and imitate it. This ability has become highly developed because of O's hearing impairment. O's mother enjoyed the fact that O behaved freely during the sessions, as well as at home. Both parents said that the emphasis at home is on speech rather than music.

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<sup>49</sup> O's mother was not in attendance during the sessions.

O's brother and sister, as well as her grandmother, provide her with singing experiences and she happily responds by joining them.

Both parents are happy about the great enjoyment that O had in music therapy and acknowledge its importance. O's mother said that O had interesting experiences in music therapy and described the music therapy as a constructive experience for her. Due to O's positive experience in music therapy, O's mother is thinking of giving her more musical instruments at home so that she can freely explore them.

O's mother stated that her expectations before the commencement of the study were fulfilled.

***Pre-research trials- Narrative of O's father:*** O had no special preferences for specific musical sounds, styles of music or certain volumes that she likes to listen to, although she enjoyed increasing the volume of the computer's speakers. O greatly enjoyed playing a toy drum and a xylophone that the family has at home. From time to time, O's father tried to sing children songs for her. O's grandmother was accustomed to singing songs for her or making her listening to music and O happily responded to that.

The expectations of O's father before the commencement of the study were that O would enjoy the music and like it.

***Post-research trials- Narrative of O's father:*** At home, when O hears music and has an audience, she greatly enjoys performing a dance or a song. When the computer is on, she enjoyed increasing the volume of the computer's speakers. O's father tries to sing children's songs for her. If O feels that someone sings a song for her, she cooperates. She enjoys making sounds from different objects, for example, xylophone. Her grandmother sings for her and also puts on music for her to listen to. O responds by dancing and trying to join the singing.

O's father described her insistence on always being first in other situations. He was surprised to see that in the music therapy sessions she waited patiently to see what was expected from her and was relaxed. He said that compared to the music therapy sessions, at home she is less patient when someone enters her territory.

Both parents spoke about O's ability to connect with all the things that she hears in her environment. Both parents said that the emphasis at home is on speech rather than music. However, O's father is willing to apply several experiences that he saw in

the video clips, such as listening to songs and finding an associated picture as well as exploring music instruments.

Regarding the expectations of O's father before the commencement of the study, although he didn't respond to that question in the post-intervention questionnaire, the comments he made suggest that these expectations were fulfilled.

### **4.3 Conclusion**

The results of this study are summarized in Table 4.13. Results related to reliability will be presented first. They will be followed by (1) the results of the data analysis of dependent variables, and (2) additional results related to the parent pre-and post-intervention questionnaires and parent interviews.

All results will be fully discussed in the next chapter.

Table 4.13: (a) Results: Reliability

	Analysis	Statistical tests and results	Findings
Target behaviors	Inter-observer reliability	Agreement ICC for six variables: 0.91-0.99 Agreement ICC for duration of spontaneous synchronization: 0.76	A very high level of agreement between the two independent observers for the six target behaviors, and a relatively high level of agreement for duration of spontaneous synchronization
Session part	Inter-observer reliability	Cohen's Kappa: 0.89	A very high level of agreement between the two observers related to the independent variable of <i>session part</i> (directed vs. undirected)
Therapist's behavior	Analysis related to therapist's behavior: (a) Inter-observer reliability: Rating the therapist's interactions on 14 variables taken from the Parent Child Early Relational Assessment  (b) PCERA analysis	(a) Percentage agreement reliability: 72.14 % or 94.25%, due to two different methods found in the literature  (b) Music therapy: M = 4.68 (SD = 0.69) Play: M = 4.75 (SD = 0.55) Very close values of means and SD's	Affective and behavioral characteristics of the therapist were found to be similar, consistent, and comparable when comparing therapist's behavior in undirected and directed play with undirected and directed music therapy



**Table 4.13 (cont.): (b) Results: Effects of music therapy**

Analysis		Measurement/assessment tools	Statistical tests and results	Findings
Session analysis: Main effects and interactions	Condition		For all dependent variables: GLMM using Poisson distribution: Music therapy had significant effect for all dependent variables ( $p < .001$ )	<i>Music therapy</i> increased the frequency and/or duration of spontaneous imitation, initiation, synchronization, turn-taking and number of events of turn-taking to a much greater degree than <i>play</i> .
	Session part	Video analysis of 75 sessions of 20 minutes each	(a) GLMM, $p < .05$ (b) GLMM, $p < .001$ (c) GLMM, $p < .01$ (corrected on June 10 <sup>th</sup> 2010 with permission) (d) GLMM, n.s.	When comparing the independent variable of <i>session part</i> ( <i>undirected</i> vs. <i>directed</i> ), the <i>undirected part</i> in music therapy and in play resulted in- (a) Increased frequency of spontaneous turn-taking (b) Longer duration of spontaneous turn-taking (c) Increased number of events of spontaneous turn-taking (d) No interaction effect for <i>condition</i> with <i>session part</i> .
Parent pre- and post-intervention questionnaires		Pre- and post-intervention questionnaires	(a) Paired sample t-test, n.s.  (b) Fisher's exact test, n.s.	(a) Likert-type questions: No significant differences between the mothers' or the fathers' ratings on the pre- and post-intervention questionnaires. (b) 'Yes/no' questions: No significant differences (c) Free-text answers: The information provided by the parents about their children's involvement with music in daily life was too diverse to discern similarities between children, or changes between pre-and post. (d) Due to the difficulties mentioned in (c), a case study narrative from the parents' comments and the interview material was written on each child to describe the child's engagement and enjoyment of music in daily experiences.

Table 4.13 (cont.): (b) Results: Effects of music therapy

Analysis	Measurement/assessment tools	Results	Findings
Parent interviews	Semi-structured interview	<p>Thematic analysis: Six main themes that include sub-themes which manifest similar patterns or similarities</p> <p>(a) Themes 4b, 5c, 6a</p> <p>(b) Themes' frequency: Mothers: 119; Fathers: 45 (Four mothers and three fathers were interviewed)</p> <p>(c) Themes 1a, 2a, 3d, 4c, 5d</p> <p>(d) Theme 3c</p> <p>(e) Themes 4a, 4d, 5a, 5b, 6b</p>	<p>Main finding: The frequencies of specific themes for mothers and fathers (separately) within the different categories reveal that most parents were highly appreciative of and satisfied with music therapy, and expressed interest in applying different activities that they saw during the sessions or in the video clips.</p> <p>Additional findings:</p> <p>(a) Three specific themes supported the primary research question which related to the effect of music therapy;</p> <p>(b) The mothers contributed significantly more comments and therefore generated more themes than the fathers;</p> <p>(c) For five themes, there is no clear difference in frequencies between the mothers and the fathers;</p> <p>(d) One theme appeared only once in an interview of one father;</p> <p>(e) Five themes appeared only in the mothers' interviews.</p> <p>The parent's reflections and thoughts in relation to their child's participation in music therapy were described in a case study narrative.</p>



## **Chapter 5**

### **Discussion**

The discussion chapter will first restate the main findings of the study. Then the findings will be systematically discussed in relation to previous studies referred to in chapter 2, as well as to studies in the literature published after the data collection in this study had begun. The order of presentation will be the same as used in the results chapter- beginning with the main effects and interactions from the session data analysis, followed by the findings from the parent questionnaires and parent interviews. This chapter will continue with a discussion of the limitations of the study and the methods used to minimize them as well as implications for clinical practice and further research. Finally, conclusions on the overall value of the study will be presented along with a reflection on the author's research process.

#### **5.1 Summary of the main findings**

This study investigated the effect of music therapy on spontaneous communicative interactions of five young children with CI. The results suggested that music therapy promoted communication by increasing the frequency and/or duration of spontaneous imitation, initiation, turn-taking, and synchronization of these children to a much greater degree than did play, the control condition.

When comparing the two session parts of each session - the directed part with the undirected part - the undirected part in both music therapy and in play yielded a greater frequency and longer duration of spontaneous turn-taking, as well as an increased number of events of spontaneous turn-taking.

Regarding the child's engagement in and enjoyment of music in daily experiences, the findings from the parent questionnaires (ratings or yes/no questions) revealed no differences between the mothers' or the fathers' descriptions on the pre and post-intervention questionnaires in spite of the music therapy intervention. In addition, the information provided by the parents in their free-text answers was too diverse to discern similarities between children, or changes between pre and post-intervention questionnaires.

According to the parent interviews, specific themes that appeared more frequently for the mothers and fathers (separately) revealed that the parents acknowledged the importance of music therapy. They expressed their satisfaction

with it as well as their interest in applying different activities they had seen in the sessions. This was true for both those who attended the actual sessions and those who only saw them via the video clips prior to being interviewed.

The interview material as well as the free-text answers from the questionnaires served as a basis for a narrative report written on each child to provide the reader with a deeper understanding and perspective of each parent's perception of their child.

## 5.2 Discussion of findings from session analysis

The session analysis consisted of frequency and duration data of four spontaneous communicative interactions: imitation, initiation, turn-taking, and synchronization. The findings imply that music therapy was more effective at facilitating a greater frequency and/or longer duration of these behaviors ( $p < .001$ ) when comparing the music therapy condition with the play condition for the five young children who participated in this study. Comparing the independent variable *session part* (directed vs. undirected), the undirected session part, either in music therapy or in play, yielded a greater frequency of spontaneous turn-taking ( $p < .05$ ), longer duration of turn-taking ( $p < .001$ ), and increased number of events of turn-taking ( $p < .01$ ). No significant effect was found for the interaction of *condition* with *session part* for any of the variables.

As mentioned in section 3.1, this study utilized an embedded experimental model, where priority was given to the quantitative methodology while the qualitative aspects of the method were subservient. Evaluating the above quantitative findings requires considering some related issues first, before explaining possible reasons for these findings (Beith-Marom, 1986; McKinney, 2005). The first issue is the integrity of data collection procedures (McKinney, 2005). McKinney states that these procedures contribute substantially to the quality of the body of the research and the applicability of the results. Girden (as cited in McKinney, 2005) indicates that three issues are central to the evaluation of data collection in quantitative research:

- Controlled observation (i.e., the precision under which the data are collected);
- Reliability;
- Validity.

*Controlled observation:* In an attempt to apply controls in the present study so

that sources of extraneous variance will be minimized, a few strategies were carried out:

- The type of design chosen was a randomized A-B-A-B cross-over design- a powerful design (Gall et al., 1999; Richards et al., 1998), due to the fact that the reversibility of the behavior and treatment can be met (see section 3.1). For a comparison of music therapy and play, the subjects were randomly allocated to receive them in either the order A, B, A, B or counterbalanced, in order B, A, B, A, to control for order effects.
- Order effects were also minimized by alternating the sessions following the first session between the undirected and directed parts (the first session in each stage, whether it was condition A or condition B, always started with the directed part of the session).
- Treatment fidelity, which refers to the methodological strategies used to monitor and enhance the reliability and validity of behavioral interventions (see section 3.9.1.2), was increased by providing a detailed protocol with a clear procedure, accompanied by guidelines and specific techniques to be followed for both music therapy and play conditions. As a real life study rather than a laboratory experiment, there was some inevitable and necessary flexibility within the implementation of the trials to adapt to the child's individual needs and ability. A well-designed treatment manual and fidelity check are crucial for future replication. The researcher did not find any previous clinical study that used a protocol with children implanted with CI. Therefore, as mentioned in section 3.1, the relevant literature in music therapy and psychology along with the researcher's own clinical experience with this population helped with the writing of this protocol (see also section 5.6).
- Specific inclusion criteria to the participant sample were determined and the information from the subjects' personal files was also double-checked by administering the Infant/Toddler Sensory Profile as an additional screening tool.

The detailed information provided in the protocol allows for the best possible replication of the study with other samples or in other settings. According to McKinney (2005), this can increase confidence in the underlying mechanisms and in

the ability to predict outcome.

*Reliability* of the observations collected is a function of the precision of the instruments or observational methods used as well as their appropriate use (Beyth-Marom, 1986, unit 8; McKinney, 2005). Thus, in the present study, reliability was computed in relation to three areas: (a) target behaviors, (b) the independent variable *session part*, and (c) the therapist's interactions with the children (see sections 4.1.1, 4.1.2, and 4.1.3). The data for computing these inter-observer reliabilities were based on DVD observations of all sessions, which, following Robson (see section 3.4.3), were used systematically, skeptically and ethically. Regarding the target behaviors, there was a high level of inter-observer reliability with ICC's of above .90, with one exception of 0.76 for duration of spontaneous synchronization. The ICC for spontaneous imitation was the highest (0.99), possibly due to the ease with which it could be clearly identified in the videos. However, measuring the duration of spontaneous synchronization was a more difficult task, which may have resulted in a lower ICC though still considered being relatively high. The high level of agreement between the researcher and the independent observer on these variables was achieved by (1) providing operational definitions which were highly detailed (see Appendix P) and were precise enough to enable the independent observer reliable coding of the target behaviors, and (2) training the independent observer intensively before the actual analysis.

Regarding the independent variable *session part*, Cohen's Kappa was found to be 0.89, which is considered very high. This result attests to the fact that the independent observer was able to identify as accurately as possible and then document whether a specific part of a session was directed or undirected according to the definitions she received prior to the task. This also indicates that these definitions precisely reflected that the therapist implemented the protocol guidelines (see Appendix A) as consistently as possible in the two session parts, in all four conditions of this study, thus increasing treatment fidelity. Clarity and understandability in the definitions also ensure consistently reliable analysis by an independent observer.

*Validity* has already been discussed in the Method chapter (see section 3.10). In addition to the efforts to strengthen internal validity as described in this current section, and in order to strengthen external validity, the protocol for music therapy and play was undertaken with the first child in this study, and was replicated with four more children (see section 3.1) so that fewer changes in the dependent variables

would be attributable to extraneous or confounding variables. Due to the small sample size, the generalizability of the findings, or the external validity, is limited to the subjects in this study. However the results are sound enough to provide a platform to generate hypotheses for future studies in this field.

As mentioned, the results suggest that music therapy promoted communication by increasing the frequency and/or duration of the target behaviors of the children in this study to a greater degree than did play. Possible explanations will be given below for these findings as well as their reference to previous studies by discussing the effect of music therapy compared with play, followed by a discussion of the presence or absence of direction in both the play and music therapy conditions.

### **5.2.1 The effect of music therapy vs. play**

One might expect that these children, who had almost no auditory experience whatsoever at the beginning of this study, would demonstrate more turn-taking and synchronization in their play during the play condition because these behaviors were already part of their behavioral repertoire. However, the findings revealed that music therapy enhanced these particular spontaneous communicative interactions to a greater degree than in play, which strengthens the results of this study. In addition, although the researcher tried her best to provide a permissive atmosphere of warmth, empathy, understanding, and ‘unconditional positive regard’ (see section 3.8.2.1.2 on the Rogerian approach) and to sensitively and attentively respond to the child’s communicative behaviors in both conditions in order to facilitate the best possible development of communication, music therapy clearly emerged as more effective than play in facilitating the communicative interactions investigated in this study. A possible explanation for this finding relates to the difference between the children’s experience in music therapy and their experience in play. Besides offering a non-verbal medium for communication (see also section 2.2.9), the children’s experience in music therapy was a more affective or emotional one due to some inherent emotional qualities in music. The musical environment set up for the children in music therapy enabled them to experience various activities involving sound which opened a whole new world for them to explore. Sound generally and musical experiences in particular are attractive, appealing, often exciting for many people and particularly for children who until they are implanted are unable to appreciate and benefit from the world of sound. A new meaning to the sense of hearing becomes



available to them and accomplishing hearing-related experiences is a source of gratification for them. In addition, musical instruments have their own unique attraction, both for the sounds they make on their own, but also more particularly for the interaction through sounds with another. Therefore, playing musical instruments was in itself a very special experience. The emotions that seemed to emerge were, for example, excitement, joy, pleasure, satisfaction, surprise, and anticipation (or even a fear reaction or shock in the beginning, which quickly disappeared and were replaced by the above emotions). Greenspan and Lewis (2002) indicate that when the emotional response is heightened, the responsiveness is increased. The emotional meaning actually fuels the action. They state that affective interactions foster further development of social and pragmatic communication. Greenspan and Shanker (2004) state that affect serves as a mediator between sensation and motor response, connecting the two together. In addition, there was also evidence from the parent interviews that pointed to the enjoyment and excitement their children showed during music therapy (see Appendix M).

As mentioned in section 2.2.8, play and music were described by van der Linde (1999) as related activities which are both important for the child's cognitive and emotional development in terms of their endless possibilities and potential for early childhood communication. Bunt (1994) indicates also that making music with children shares many features with a developmental view of play. He describes his work with pre-school children as 'playing with sounds', when actually, as in play, there are no strict rules (see also section 2.2.8). The main way to stimulate the children in this study to initiate spontaneous communicative interactions was by providing them with various musical instruments/CD player for the music therapy sessions and toys/games for the play sessions. These are secondary means which can be used for communication with the body and the voice serving as the primary ones. As mentioned in section 3.8.2.1.1 and in Appendix A, the number and variety of musical instruments and toys/games that were utilized was similar in both conditions. No new instruments/toys were introduced during the research trials to prevent novelty effect. In addition, no sound toys/games were available during the play session. However, in play, besides using body and voice, the child could create sounds by touching one toy with another one or by making the toys/games fall down, e.g., some children liked to listen to the sounds the Duplo blocks made when dropped into the plastic bucket, one after the other. These sounds were really more monotonous and

are likely to have had less emotional effect than listening to or playing various musical instruments (which have much richer timbre) or listening to a song on the CD player and deriving a sense of mastery as a result of song repetition. However, a more emotional interaction was created when the therapist responded to these monotonous sounds through the use of different empathic techniques such as matching, imitating, or mirroring with the voice, body, or by using other toys (see sections 3.6, 2.2.4.1, and 2.2.4.4 regarding these techniques) Bunt (1994) refers to music-making and indicates that "there is often much playful repetition, particularly as the reward is such rich and pleasurable experience" (p. 97). In this study, this was evident in the videos as a gratifying experience that created a joyous atmosphere and pleasurable interaction with the therapist. Bunt (1994) adds that play in music enables exploring a range of feelings and that instruments that can be looked at, touched and even smelled, can take on specific characteristics or become imaginary figures (p. 97-98). These aspects are also applicable to toys. However, Bunt emphasizes that music can sustain even destructive feelings which can be too frightening to verbalize. While the children in this study did not demonstrate destructive feelings or fears, there were examples where children screamed after hitting instruments (especially with the cymbal), which created the impression that the emotionally engaging experience was more powerful than emerged in the play situation.

With regards to the use of voice, when a child occasionally initiated free vocalizations in the undirected part of both music therapy and play sessions, the therapist further developed it through an exploration of high/low notes, laughing, and vocal glissandi (see Appendix A). In this way, the child could discover his/her voice and enjoy it, without the demands of speech and articulation. The voice could be more of a general communicative channel which also helped to build vocal skills and vocal confidence. Responding to the child's use of voice in the play condition as well actually increased the communicative interactions such as turn-taking, but this increase was not enough to achieve greater frequency and/or duration of this behavior in play when compared to music therapy, since most of the use of voice in play was limited to speaking. In the directed part of the music therapy sessions, the therapist used her voice for singing the opening/closing songs, for vocally based rhythm games and/or for initiating/responding to vocalization with the child. It actually served as an additional musical instrument, which enriched the child's experience and affected the responsiveness.

Since different concepts echoed in the researcher's mind during the clinical work with the children, it can be interesting to look through another theoretical 'pair of eye glasses' on the experiences with the children in both conditions as well as in the two session parts. While this study did not set out to establish specific connections with early infant research because the age of the children in this study was different and they had already developed a range of communicative skills which they used without being able to hear (What the CI developed was a further range of skills because they started to hear), some concepts from the developmental perspective of infant researchers such as Stern, Trevarthen, and Malloch, are of relevant interest for explanations of the above findings. Stern's concept of the affect attunement that happens between the mother and her baby seems relevant to what happened between the therapist and the children in the sessions. During the course of normal development, infants and primary caregivers interact with each other's gestures, facial expressions, and vocal interactions through 'affect attunement', which is "the performance of behaviors that express the quality of feeling of a shared affect state without imitating the exact behavioral expression of the inner state" (Stern, 2000, p. 142). Stern claims that when the infant is about nine months old, the mother seems to intuitively add another dimension to her imitation-like behavior, which is geared to the infant's new status as a potentially intersubjective partner. The characteristics of affect attunement are:

1. They reflect behaviors that are more indicative of matching than exact imitation.
2. The matching is largely cross-modal, i.e., the mother matches the infant's behavior in a channel or modality which is different than the one used by the infant.
3. What is being matched is some aspect of the behavior that reflects the person's feeling state rather than the other person's behavior per se. Thus, the match is between expressions of inner states.

Stern refers to three features of attunement, which are intensity (absolute intensity/intensity contour), timing (temporal beat/rhythm/duration), and shape (Stern, 1985, p. 146). According to Stern, attunement behaviors are so important because they recast the event and shift the focus of attention to the quality of feeling that is being shared, which is behind the behavior, while true imitation does not permit the

partners to refer to the internal state. Musical interaction in music therapy is strongly related to affect attunement. In this study, affect attunement was more evident in music therapy than in play, and thus served as a motivational factor which resulted in increased communication. For example, the significant effect of spontaneous synchronization in music therapy attests to the fact that the children had high motivation for sociability and they joined the therapist's action more often and for longer duration than in play. Stern adds also that most attunements seem to occur with vitality affects, which are “those dynamic, kinetic qualities of feeling that distinguish animate from inanimate and that correspond to the momentary changes in feeling states involved in the organic processes of being alive” (p. 156). They are different than the categorical affects such as anger, sadness, happiness, fear, disgust, surprise, interest, and perhaps shame and their combinations, and are better captured by dynamic, kinetic terms, such as “surging”, “bursting”, “crescendo”, “explosive”, etc. These were certainly evident in both conditions but seemed to have been expressed more in music therapy rather than in play. Kim (2006) refers to the mutual music making process in music therapy and calls it 'musical attunement' since it has analogous features to 'affect attunement' where the core components were identified as largely musical (intensity, timing, and shape). In her study with young children diagnosed with autism, 'musical attunement' was more effective than mere 'attunement' in engaging the child in mutual play. One of the reasons she indicates regarding this finding, which is also relevant to the current study, is the fact that music is essentially 'emotional' as well as 'relational' as stated by Prof. Ruud during the PhD course in Aalborg University (May, 2006). With regards to play, the children in this study were 2-3 years old. Therefore, their play was frequently solitary, without necessarily sharing their toys with the therapist. Obviously, one can also play alone with musical instruments, but what was observed was that interaction through sound/music was more appealing, especially for these children. In addition, interaction through music is possible even when there is a relatively large physical distance between the participants and this may have an effect on the frequency and/or duration of the interactions. This is more difficult in play, as Kim (2006) writes in her doctoral study. In the current study, even if the child occasionally wandered around the room, he could, for example, hit the cymbal or beat the bongos and the therapist responded to it immediately. This was a form of interaction that was impossible with

most of the toys provided (unless the interaction in play was through sound by the use of toys or vocalizations, as did happen).

Another concept relevant to the explanation of the increased communication in music therapy in this study is communicative musicality (Trevvarthen & Malloch, 2002), presented in section 2.2.9. To mention briefly, Malloch (1999) refers to it as the vehicle which carries emotion from one to another. The infant and the caregiver enjoy being engaged in the experience of interacting with communicative musicality (Malloch, 1999; Trevvarthen and Malloch, 2002). According to Trevvarthen and Malloch (2002), "communicative musicality facilitates turn-taking on a shared pulse, regulates the pitch-contours of the vocalizations of both parent and infant, and inflects the timbre of vocalizations" (p. 11). Following Trevvarthen and Malloch, Wigram and Elefant (2008, p. 423) believe that "the quality of musical engagement and its clinical benefits depend on engaging with the motives of communicative musicality considered to be the foundation for the healing process. In this study, the therapist uses different techniques such as matching, interjecting, making space, mirroring, imitation, etc. (see sections 2.2.4.1~ 2.2.4.4 regarding these techniques) in both music therapy and play condition to support the natural motives of communicative musicality in order to increase communication; however, since communicative musicality is inherent in music therapy, it may have facilitated more communication. As Trevvarthen and Malloch (2000) state: "Communicative musicality is the source of the music therapeutic experience and its effects" (p. 3).

As mentioned in section 1.1, although the researcher sometimes saw children, particularly in the first year after implantation, who deliberately removed the external part of the CI system in order to return to their familiar silence, such a reaction never happened during the music therapy sessions. Since they could exert control even in the directed part of the music therapy sessions by choosing their way to participate, or by declining to participate in any way (see section 3.8.2.1.2), as well as being exposed to the musical parameters in a controlled way (see section 1.2), music therapy was a positive experience for them rather than an overwhelming one.

***Reference to previous studies:*** There is an extensive history of research on the effect of music therapy on communication, primarily on children with developmental disabilities (Aldridge, Gustoff, & Neugebauer, 1995; Bunt, 1994; Elefant, 2002; Holck, 2004; Müller & Warwick, 1993; Wigram, Pederson, & Bonde, 2002; Wigram, Saperston, & West, 1995). In a recent article, Walworth (2009) investigated the effect

of music therapy intervention on premature infants' and full-term infants' (7-24 months old) developmental responses and parental responsiveness. Infants who attended the developmental music group demonstrated significantly more social behaviors during parent-infant toy play than infants who did not attend the music groups ( $p < .05$ ). This result is in agreement with previous findings that music maintains high attention levels that are significantly greater during music based instruction groups when compared to play-based instruction groups for preschool age children (Robb, as cited in Walworth, 2009). However, in regards to music/music therapy and CI, a search of the literature revealed that most of the research refers primarily to music perception (Donnelly & Limb, forthcoming, 2009), while fewer studies focus on involvement and enjoyment of adults and school-aged children with CI. No controlled studies on the effect of music therapy on communicative interactions of young children following cochlear implantation were found (for references see section 2.3.4 and 2.3.5). In congruence with the current study, Radbruck (2001) found a positive change in the communicative behavior of eight children with CI (out of nine), ages 3-6, who demonstrated significant changes within 10 sessions of music therapy (see section 2.3.5). In accordance with this study (see Appendix A & N), Radbruck recommends using simple and clearly built music.

In a recent doctoral thesis by Kim (2006), improvisational music therapy was more effective than free play at improving joint attention behaviors in 10 children with ASD, ages 3-6. The relevance of Kim's study carried out on children with ASD to the current study is due to the implementation of music therapy vs. free play, a directed vs. a non-directed session part, and detailed protocol for both conditions. Kim's most clinically relevant and important findings were that the children spontaneously demonstrated markedly more and longer events of 'eye contact', 'joy', 'emotional synchronicity', and 'initiation of engagement' in music therapy and in the unstructured session part, as well as improved turn-taking when compared with the play condition in the directed part of the session. Kim refers to attunement as the underpinning theory and principle of her study, and concludes that "the findings highlighted the 'motivational aspects' of musical interaction between the child and the therapist..." (p. i). As in Kim's study, the musical interaction seems to be the key factor in the current study. Wigram et al. (2002) state that communicative intentionality is created through the use of the musical elements and a shared repertoire of events that have meaning and context are developed between the

therapist and the client.

### **5.2.2 The effect of undirected vs. directed session part**

Before explaining the findings in relation to the independent variable *session part*, another issue needs to be addressed. Initially, the researcher used the terms ‘structured’ and ‘unstructured’ for the two session parts rather than ‘directed’ and ‘undirected’. Within the therapeutic framework, the word ‘structure’ implies a logical order or pattern designed primarily by the therapist and understood by both partners during the communicative interaction; thus, the structured part of a session was defined as a situation or an experience in which the therapist instructed or facilitated the child to do a specific task. The therapist provided structure while allowing flexibility. The unstructured part was one in which the therapist and child spontaneously engaged in a musical experience or play situation. However, following discussion and evaluation of pilot material from the videos, a new perspective came to the fore regarding the question of whether the unstructured part of the session was really unstructured. It became apparent that in the unstructured part of the session there was a level of structure that was introduced by the child rather than by the therapist, and when the therapist followed the child, this structure consolidated and became a shared structure. This led to the clarification, development and refinement of the definitions to ‘directed’ and ‘undirected’ in order to ensure through inter-rater reliability, that there was a perceived difference between the two parts of the sessions. Children do structure their own experiences, even when they are very young, and during the sessions they were structuring the experience to make sense out of it. That is the way they learn. The issue of structure is an important aspect of communication whether it be verbal or non-verbal. The turn-taking process, for example, is a classic example of a communicative structure- as is imitation. Holck (2002, 2004) relates also to these two different approaches and states that a structured approach can work developmentally with the child’s pathology by providing the child with new experiences and expanding them within the child’s capacity for flexibility. The unstructured approach can be used to build up a good therapist-child ‘commusical interplay’ (see section 2.2.4.2) in order to maintain and develop the musical interaction that may be crucial for further development of communicative skills. In a recent new book on the psychological processes in deaf children, Edwards and Crocker (2008) write in favor of the undirected approach and emphasize that the

adult's behavior should be "rhythmic, timely, flexible and adaptable to the demands and needs of the child, following the child's lead rather than being directive and intrusive" (p. 27).

As previously mentioned, the undirected part in music therapy and play yielded greater frequency and longer duration of spontaneous turn-taking, and increased number of events of spontaneous turn-taking. An explanation of these findings relates to the issue of control. A reduction of therapist's control in the undirected session part yielded better results in relation to turn-taking. Children around the age of two years old have the wish to assert control over the adults in their lives and to feel omnipotent. When they are provided with opportunities for control in a constructive, positive way, as was the case in the undirected part of the session, it may result in enhanced communication (see Oldfield, 2006, p. 72).

The advantage of an undirected approach over a directed approach is in congruence with the study by Spencer and Gutfreund (1990), who indicated that a mothers' style of control in turn-taking and choice of conversational subjects is not positively related to a child's language development (see section 2.2.3). Another related study by Day and Prezioso (as cited in Dromi & Ringwald-Frimerman, 1996; see section 2.3) on Hd dyads, referred also to the mothers' over-teaching style, which prevents the child from initiating and leading the conversation. The three factors that can explain the phenomena of this over-teaching style were detailed in section 2.2.3. In the current study, the increased communication in the undirected session part attests to the fact that the children had space and freedom to communicate in a manner of their choice without feeling pressured by the therapist to do so verbally. In the undirected part they were able to use their communicative skills to sustain the engagement.

Affect attunement (as well as communicative musicality referred to previously) was more evident in the undirected part of the session, and resulted in increased communication in both music therapy and play, since the child had the freedom to spontaneously initiate and structure the experiences and the therapist had her freedom to 'dance' with the child, to respond in an adaptive and flexible way, without having the protocol constraints of the directed part.

The undirected session part did not yield significantly a greater frequency and/or duration of the other target behaviors- imitation, initiation and synchronization. If spontaneous imitation is an act that is carried out spontaneously by the child after



watching the therapist's action (for precise definition see section 3.6), there were less opportunities for it to occur in the undirected part, because that part was child-led - The child predominately initiated and structured this session part and the therapist tried to follow the child's initiatives. Nor was the frequency and duration of synchronization significant because for this communicative interaction to be identified and coded, the child needed to match the therapist's action spontaneously and simultaneously (rather than successively) while the therapist was the one to start. Thus, just as with imitation, it could occur less than during the directed part since the therapist followed the guidelines in the undirected part. Regarding initiation (see section 3.6), it might have been that some of the child's spontaneous initiatives were developed into turn-taking because this part of the session enabled it to happen more often.

**Reference to previous studies:** No controlled studies were found by the researcher on the effect of directed and undirected session parts in music therapy with the exception of Kim's study (2006), as mentioned in the previous section. Kim referred to 'unstructured' and 'structured' session parts in her study on children with ASD. In the detailed treatment manual for the music therapy sessions and the free play, she gives guidelines to the therapists in both session parts, which are similar to the definitions of the two session parts in this current study (see section 3.7): The unstructured part (15 minutes) was child-led (option approach), and the therapist was instructed to follow the child's focus of attention and interests by "mainly imitating, matching, synchronizing with the child... (from imitation to contingent play)" (p. 457, 463). In the structured part (15 minutes), which used a directed, therapist-led approach, the therapist was instructed to behave gently and sensitively when "introducing more structured musical play (such as turn-taking and modeling) within the tolerant level of the child" (p. 457, 463). As mentioned in the previous section, Kim found that in the unstructured part, the children displayed more initiatives, demonstrated more joy, and were more able to express their emotions and share their affects with the therapist.

To conclude the above discussion on the directed and the undirected part, the following quote from Wigram and Elefant (2008) serves as a summary:

In its professional use as therapy, music can be employed as a prepared or composed container, setting boundaries, structuring, supporting and guiding the client. On the other hand, it can offer a free space for expressive

improvisation- one that can mirror the client's feelings beyond the boundaries of his or her disability, allowing the two human beings to share company as equals. When the skilled music therapist prepares an inviting environment, presents the client with appropriate opportunities, and stays attuned to the client's needs and abilities, the stage is set for a live and intimate conversation (p. 442).

### 5.3 Discussion of parent questionnaires

The quantitative findings in the questionnaires (Likert-scale ratings and 'yes/no' questions) revealed that in spite of the music therapy intervention, the fathers' or the mothers' answers regarding their child's engagement and enjoyment of music in daily experiences were not significantly different when comparing pre to post-intervention questionnaires. This means that the parents were not able to discern differences in the child's music-related behaviors/experiences within a period of about four months- the approximate duration of the study for each child. In addition, the qualitative findings, i.e., the free-text answers, provided information that was too diverse to discern similarities between children or changes between pre and post. Although the questionnaires did not provide enough data to strengthen the quantitative results in the video analysis, some of the themes in the case study narratives (from the free-text answers in the questionnaires and the interview material) do talk to the value of music therapy for these children. This will be elaborated further on.

Possible explanations for the findings refer to three factors (either one factor, or a combination of them) which could influence the validity and reliability of the questionnaires and cause bias:

1. The actual questions and their phrasing;
2. The administration of the questionnaires;
3. Biased results from the respondents.

***The actual questions and their phrasing:*** As detailed in section 3.4.2, the pre and post-intervention questionnaires were specifically designed by the researcher by incorporating general guidelines as well as more specific recommendations suggested in the literature, such as a clear, uncluttered format, clear instructions and introductory comments, relevant clear questions within the parents level of understanding, avoidance of double-barreled, leading, and overlapping questions,

sufficient response categories, and the use of open-ended and closed-ended questions. The researcher was aware of the pros and cons of each guideline/recommendation and designed the different items as carefully as possible. In addition, as mentioned in section 3.10, face validity was obtained by pre-testing the questionnaires (see also section 3.4.2).

For the three Likert-type sub-scales in the questionnaire (see Appendix I, questions 1, 2, & 7), internal consistency analysis was carried out and Cronbach's alpha was computed (see section 4.2.2). As presented in Table 4.10, the highest internal reliability of 0.9 was found for subscale 1 ('Responsiveness to music heard via recording or radio'), for the fathers. Thus, this scale is more applicable for future research because of its internal validity compared to the other scales. In addition, the analysis that was carried out to examine whether the three sub-scales can be combined to an overall scale which measures the child's responsiveness to the media of music (i.e., instruments, voice and listening experiences) did not yield any results due to too many missing data which may be attributed to different reasons concerned with the above three factors.

One more reason for the lack of significant differences between the results from pre and post-intervention questionnaires may be due to the fact that only three mothers attended all the sessions except in the case of unusual circumstances (see section 3.8.2). Most of the questions related to experiences that were dependent on the parents and/or other family members, whether the child would be exposed to these experiences or not during the period of the clinical trials. Those who attended the sessions were exposed to different music experiences which they could try out at home. They acknowledged the value of music therapy, as some reported in the interviews. This fact could influence their responses in the post-intervention questionnaire more than the other seven parents who did not attend any session. In addition, questions #5 and #6 offered too many options that are not inclusive and could have been presented separately in a future study.

Regarding the free-text answers on the pre and post-intervention questionnaires, (see Appendix S), which were optional for the parents to complete, the results revealed much diversity. Thus, it was very difficult to find areas of agreement or commonalities necessary to create categories. Possible reasons for the difficulty in finding categories common to all the parents could be due to the following discrepancies in some of the completed questionnaires:

- No comments were offered by some on the pre-intervention questionnaire while some offered comments on the post one, or vice versa. This made it impossible to describe any change in what those particular parents reported.
- Too few comments were offered.
- Comments were too vague.
- Comments were offered that were not actually an answer to the question asked.

As mentioned in section 3.4.2, another hoped-for outcome was that the information provided would assist in developing recommendations to parents, staff, and other music therapy professionals regarding the ways they could stimulate the child's continuing growth in this area. This will be elaborated in the section on clinical implications.

As mentioned previously, the questionnaire was pre-tested with only one family of a child with CI with whom the researcher was working prior to the commencement of this study as a trial subject. This family does not necessarily represent the population of families of children with CI. This fact may be considered as a limitation and in a future study, it is recommended to first review the questionnaire with more professionals who work with this population for content validity as well as pre-testing it with more families.

***The administration of the questionnaires:*** As mentioned in section 3.8.1.3, the researcher gave the questionnaires to the parents by hand and each of them completed it at home to the best of his/her ability. Although they were invited to use the researcher's help whenever needed, none of them used this offer. Therefore, one or more of the disadvantages of administering the questionnaires (detailed in section 3.8.1.3) could have affected their responses, e.g., lack of full understanding of the questions, and lack of relationship between the parent and the interviewer, which may have lessened the parent's willingness to answer the questionnaire as precisely and deeply as possible.

***Biased results from the respondents:*** Lack of motivation, interest or fatigue may cause a superficial reading of the questions or the evasion of certain items.

Respondents may tend to generalize from their response to one question to their response to another one (halo effect). Such an effect might have occurred in this study in relation to questions 1, 2 and 7 which included the same response categories. There are respondents, who would prefer a particular direction to their responses, e.g., preferring the more extreme response categories in the Likert scale, choosing the middle response category, or having a tendency to always answer positively or always negatively (Beyth-Marom, 1986). A scale requires making decisions. Some would have difficulties with this and would get tired of it, trying to complete it as quickly as possible. The tendency to choose the middle category response was minimized in this study (see explanation in section 3.4.2). Although the parents completed the questionnaires without the researcher's help, their responses might have been influenced by their feelings toward the researcher or by what they felt was expected from them as 'good' parents in general, and specifically in terms of the music experiences they are 'supposed' to expose their child to.

One must also take into consideration that some of the parents might have been suffering from 'questionnaire overload.'

One or more of the above explanations stands for the fact that there were too many missing data in the completed questionnaires. This fact, as well as the small sample size (only five mothers and five fathers), resulted in the lack of differences between pre to post. However, as mentioned previously, some of the themes in the case study narratives (written from the free-text answers in the questionnaires and the interview material) do support the value of music therapy for these children. These will be presented in section 5.4.

***Reference to previous findings:*** There are no examples in the literature of the use of questionnaires regarding music experiences of young children with CI other than Gfeller et al., (1999) in a survey (65 subjects) on musical involvement and appreciation from which questions #5 and #6 were copied. However, the age range in that study was much larger- 2-20.5 years. One of the conclusions from the data in the questionnaires indicated that music intensity should be at a low to moderate level. In congruence with this conclusion, some of the parents in this study who responded to questions #5 and #6 referred to the fact that their child did not like loud music but the data was too meager to come to any solid conclusions, as already mentioned. The other conclusions in Gfeller's study, such as the fact that good quality sound equipment and modifying listening environments can optimize musical enjoyment, or

that children with CI have individual preferences for different kinds of music were hardly evident in this study- Very few comments were given by the parents related to the preference for a quiet listening environment and to different kinds of music that the children liked.

#### **5.4 Discussion of parent interviews**

The advantages and disadvantages of the semi-structured interview employed in this study were discussed in section 3.4.5. As mentioned in that section, being ‘complementary’ data rather than the main focus in this study, this type of interview was chosen primarily as the most adequate tool to enable each parent to reflect on what he/she saw and felt in relation to the child’s participation in music therapy and to give the parent a sense of importance and a feeling of respect for his/her opinions. The video clips for the interview were systematically selected (see section 3.8.3.2) and a DVD copy of these clips was given to the parents at the end of the interview as a souvenir.

In general, the findings from an interview are highly contingent on the interpersonal skills of the interviewer (Gall et al., 1999). Although the interviewer in this study was carefully chosen and trained to carry out the interview (see section 3.8.3.3), there may well have been specific questions to address and/or expand on, as well as ways to handle different parents' responses that the interviewer did not pursue by asking supplementary or follow up questions. She focused only on the questions she was commissioned to address, leaving the resulting interview more akin to a structured than a semi-structured interview (see Appendix M). In a reflective discussion with her after the interviews ended and had been transcribed, she said that in a way she felt as someone 'external' to this study and more comfortable sticking closely to the interview schedule. In addition, with some of the families, she felt it was not correct for her to further pursue some of the questions and preferred to leave the parent's response as it was. The fact that the interview was more a structured rather than a semi-structured one as was originally intended, actually enhanced its reliability, created less chance of interviewer bias and enabled comparability since the interviewer stayed very close to the interview schedule with the parents. However, it resulted in less depth and richness of material in some cases, e.g., the interview with the three fathers.

As mentioned in section 3.9.3.2, the researcher was inspired by Miles and

Huberman's approach (Robson, 2002) in the way the thematic analysis was undertaken. The stages recommended in their approach served as a basis for the analysis and proved to be effective, as evidenced by the findings of themes and sub-themes to be presented further in this section. The analysis involved a close interaction between the researcher and the text, attempting to understand what the parent was saying but, as part of the process, drawing on her own interpretative resources.

Regarding the cooperation of the parents, as mentioned in section 3.8.3.3, only four mothers and three fathers were interviewed. The thematic analysis, based on these seven interviews, was not originally intended to be a quantitative analysis; however, there are some findings that one might find interesting:

1. The highest frequency was for theme 3a (pride/satisfactory/joy regarding child's behavior/abilities). As mentioned in section 4.2.3.2, this finding might have been expected, since it is natural for parents to relate to their child's strengths, especially when the child has a disability. There may be something comforting for the parent when he/she can relate to the child's strength. The high frequency of theme 1b does not surprise either since it is age appropriate behavior of the children in this study, i.e., between ages two and three.

2. There are other themes that appeared with high frequency: 4b (benefit of music therapy for child), 5c (a comparison between child's experiences during music therapy and child's *present* music experiences in daily life), and 6a (a comparison between child's non-musical behavior during music therapy intervention to child's behavior in daily life). The total frequencies of these themes were 24, 21 and 15, respectively. These high frequent themes actually support the quantitative results of the video analyses (see Appendix T for examples).

3. When comparing the themes' frequency between the mothers and the fathers, in many themes there was no clear difference (e.g., 1a, 2a, 3d, 4c, and 5d). In other themes, there appeared to be quite a difference (e.g., 1b, 3a, 4b, 5c, 6a, 3e. See Table 4.12 and section 4.2.3.2). Most of the highly frequent themes came from the fact that the mothers contributed significantly more comments (see also Appendix T for examples) and therefore, more themes emerged than from the fathers' comments. This, in spite of the fact that there were four mothers and only three fathers. There are altogether 164 themes- 119 for the mothers and 45 for the fathers. This means that the themes' frequency for the mothers was greater, perhaps due to their greater

involvement as the primary caregiver and more intuitive of the two parents. A possible explanation for this may be the religious background of the families. Boys are raised from early childhood to be religious students and have had little to no experience taking responsibility for young children. This relates to O's and Ay's father. Regarding Af's father, although he was secular while his wife was religious, he believed that raising the children and helping Af, is his wife's task (see Appendix M9). This information on the three fathers has some bearing on the results. These fathers are not as involved in raising their children, were less open, and had more difficulty relating to the questions. Thus, there was a tendency for the information they gave to be more limited. The interviews with them were shorter and more concise. The mothers have very frequent contact with the people who take care of their children such as the staff in the kindergartens, the speech therapists, etc. It is very likely that they knew their children better since they are the ones who are much more involved in their raising. The mothers in general seemed also more open to such questions as in the interviews. Another relevant issue is the fact that none of the fathers attended the sessions. This may have contributed to their limited ability to relate to the questions. In contrast, two of the four mothers were present throughout the research period. This more intensive involvement might have enhanced their ability to relate more extensively to the interview questions. In addition, the fact that two mothers did not attend the sessions may also suggest that in spite of their absence, they could relate to the questions quite easily after watching the video clips. However, due to their absence, they could not implement some of the music experiences the other two mothers saw during the sessions and referred to as well in their interviews. This will be discussed in section 5.7, regarding the importance of the parent's attendance during the sessions.

***Reference to previous studies:*** Theme 4b in this study is consistent with the findings of Gfeller et al. (1999), Gfeller (2000), and Abdi et al. (2001) about the enjoyment of children with CI from music experiences (see section 2.3.5). The parents talked about the children's enjoyment derived from exploring different instruments and listening experiences and the contribution of the music experiences to their children. No other interviews with parents of children with CI in general and/or in relation to music or music therapy were found by the researcher. However, one article reported on the findings of a qualitative study that investigated the experiences of parents of children with HI (Corcoran, Stewart, Glynn, & Woodman, 2003). The



themes that emerged from the transcript analysis were (a) impact of the diagnosis, (b) coping, (c) decision making, (d) parent-child relationship, and (e) role of professionals. In regard to the latter theme, the parents were concerned by the impact that various professionals had on their life, both at the time of the diagnosis and later in the child's life. They brought up both the positive and negative elements in the areas of communication and relationship. On the positive side, the parents stressed the importance of the professionals' inner attentive listening that enabled them to attend with compassion to the stories of the parents. On the negative side, they brought up their experiences related to the professionals' insensitivity. Professionals such as music therapists were not mentioned in this article. Obviously, this issue is relevant to the music therapy milieu as well since it may have an impact on the parents' attitude to the music therapists and to experiences the parents may glean from the music therapist and subsequently implement in their child's daily life at home.

### **5.5 Discussion of protocol for music therapy and play sessions**

As mentioned in section 5.2 and 3.8.2.1, the protocol increased treatment fidelity. Using protocols in clinical practice and/or in music therapy research is rare. Kim (2006) used such a manual in her study with children with ASD (see section 5.2.1). Kim discussed the limitation of her protocol due to the fact that one of the therapists who worked in her study had difficulties implementing the protocol when the study commenced. That therapist resisted imposing structure on children and it took her about a month to adjust to the structure of the clinical trials. In the current study, this problem was avoided since the researcher was the one who wrote the protocol as well as the only therapist who had to implement it.

In the discussion forum of the Nordic Journal of Music Therapy (Kerem, 2006, April), the researcher referred to the advantages and disadvantages of designing and using procedures in clinical and research work:

Clinical research and therapeutic applications have been both blessed and plagued by procedures. In their best form, procedures are clear prescriptions for a sequence of effective diagnostic and therapeutic treatments to be undertaken by the clinician. This mechanistic approach has proved itself many times in both the basic and clinical sciences since:

1. The process of formulating procedures distills the essence of the method and is unlikely to become enmeshed in distracting situational irrelevancies.

2. It allows researchers to learn from the experience of others whose procedures have succeeded and thus present a ready-made formula.
3. Successful clinical procedures provide measures of validity and reliability for the theory from which they were derived.

As such, they accelerate the development of basic research suitable for applications. However, procedures have proved much more useful in pharmacological and biological treatments, than in psychological therapies. The emphasis on a mechanistic model has increased the perceived pressure on practitioners to deliver well-formed and generally applicable therapeutic procedures, or else be deemed by others as operating on the basis of intuition alone. Despite appearances, procedures fail to meet the clinician's needs due to their mechanistic nature for the following reasons:

1. Procedures are sequences of causes (i.e., treatments in this case) and their resulting effects. For the clinician, that implies that the outcome (i.e., impact) of a given treatment can always be determined before the next one is applied. However, one's mental health is influenced by factors at multiple levels (biological, social, and chemical) all co-interacting in complex ways. Consequently, evaluation of treatment effects in the sequence is, in most cases, impractical.
2. As action sequences, procedures are relatively rigid and lose their effectiveness with large between-client variability, situational differences, and unexpected outcomes.
3. Procedures are unidirectional, implying a treatment is invoked by the therapist and applied to the client. However, in mental health applications, there is a more interactive process between the therapist and the client.

Many psychotherapists have evolved a solution to the shortcomings of procedures in therapy by providing the formulation of guiding principles. Principles are general statements that remain true in spite of variations in detail. As such they allow the application of knowledge across situations and individuals and the description of the client's state across levels of observation. They provide guidance to clinicians in unfamiliar cases by specifying invariant facts about the *interaction* of the client with his/her environment and response to treatment. These invariant properties

can then serve as landmarks in the development and application of treatment strategies. Unlike procedures, strategies describe a manner of approaching therapy and coping with unexpected change, rather than dictating implementation in detail. However, due to their generality, principles and strategies run the risk of being reduced to a collection of rule-of-thumb recipes, if not compiled into a converging set of consistent factual statements. ‘Principle-based’ manuals may then provide the necessary tool with which principles can be coordinated and optimized by the collective experience of practitioners and researchers alike. The interdependence of clinical researchers and practitioners is accentuated in the challenge posed by the development of principle-based manuals. It is only in such collaboration that we may hope to find the tools to translate our general understandings into effective and systematic therapy.

Using the protocol in the current study was effective and beneficial, in congruence with Wigram's statement (2007) regarding the possible benefit of structured procedures which are consistent enough to be reliable but flexible enough to allow the therapist to respond to the child's needs rather than requiring the child to respond to the procedure (see section 3.8.2.1.1). The two distinctive session parts provided the child with two different experiences of leading and initiating vs. following and responding through mutual attunement, supported by the therapist's empathic and sensitive approach. Kim (2006) states that the protocol she wrote for her study is applicable not only to the autistic population but also to other children and adolescents with various difficulties that can be treated in music therapy. She indicates that the effect of such a protocol depends on the therapist's clinical experience and intuitive application to each client. Similarly, the protocol in the current study is not only applicable to young children with CI but also to other young children with various problems, if the therapist uses it sensitively and intelligently.

## **5.6 Limitations of the study**

This study is subject to different limitations that need to be critically reviewed due to its influence upon the reliability and validity of the study as well as its relevance for further research in this area. Several limitations have already been discussed throughout the thesis and therefore will be referred to only briefly in this section. Others will be further elaborated in this section in relation to the results, and the

methods.

### 5.6.1 Limitations of the findings

The most important limitation in this study is its sample size. Five children were excluded from the clinical trials and only five finally participated. Obviously, a sample of five children, who were not randomly chosen, does not represent the population of children with CI, and thus, the results cannot be generalized (external validity) and the findings relate specifically to this sample only. A small sample is statistically vulnerable. The test power was relatively low, although, as mentioned in section 4.2.1, the use of multiple measurements in each subject partly compensated for this. Because of the low test power, instead of relying on inferential statistics, the emphasis was on descriptive analysis which demonstrated the advantages of music therapy and the undirected session part in enhancing communication of these five children. However, establishing conclusive evidence requires further research with a larger sample.

The small sample size had an influence upon other aspects as well:

1. In regard to spontaneous initiation, no significant effect was found for the independent variable *session part* although the result approached significance ( $p = .06$ ), which may reach significance with a larger sample.
2. Due to the limited number of the subjects, applying control on the implant manufacturer variable was impossible, as mentioned in section 3.2. Four subjects had the same type of implant and one had another type (see Table 3.2). Having the same device may eliminate the possible interaction between the study outcome and the coding strategy the child was using. However, as mentioned in section 2.3.2, there is no evidence that CI devices manufactured by different companies differ in their *music perception* outcomes. A recently published article by Gfeller et al. (2008) confirmed this statement by investigating 209 adults with a wide variety of implant devices and coding strategies. The conclusion was that there was no correlation between device manufacturer, model, or programming strategy and the subject's perception or enjoyment of music.
3. One of the reasons for a lack of differences between the pre and post-intervention questionnaires completed by the mothers and the fathers (separately) was also due to the small sample size, in addition to the poor

quality of the data, as well as other limitations discussed in section 5.3 (and mentioned in section 5.5.2.2).

4. Due to the limited number of subjects it was impossible to look for differences in gender between the communicative interactions of boys vs. girls in music therapy and play, an issue which could have been interesting to investigate.

There could have been some improvement in the children whose mothers attended the sessions. Though, due to ethical considerations, these mothers were not told to implement experiences they saw in the sessions, they might have learned and adapted some of those experiences and used them at home. No evaluation was made of home based play activity with either mother or father, and there was no evidence that the results were different for the children whose mothers did attend the sessions ( $n=3$ ) when compared with those whose mothers did not ( $n=2$ ). The influence therefore of mothers learning from the modeled behavior of the therapist can only be treated as a potentially confounding variable.

### **5.6.2 Limitations of method**

Undertaking a clinical study necessarily challenges a researcher. The original thought of the researcher was that the mothers would attend the sessions due to the young age of the children, but unfortunately it became clear that this could not happen with all the parents. Only three mothers attended the sessions (except in the case of unusual circumstances). This may be considered as a limitation since it might have influenced the way these mothers answered some of the questions in the interviews, and/or responded to some of the questions in the questionnaires.

The researcher in this study also served as the therapist in both the music therapy and the play conditions due to both the young children's need for permanency and predictability and in order to neutralize the variance factor of personality characteristics in the therapist. The issue of potential bias due to the therapist's intentions in her dual role could also have been considered a limitation. However, a procedure was administered to evaluate the therapist's interactions with the subjects in both conditions (see sections 3.9.1.3.1 and 3.9.1.3.2) the findings from which indicated that there was no such bias present.

The planned semi-structured interview proved to have been carried out more as a structured interview. This may have affected the results and though it had some

advantages (see section 5.4), it limited the amount of data for the thematic analysis.

***Limitations of subjects:*** As mentioned, only five children participated in the study. Israel is a multicultural country, a fact which theoretically could enlarge the potential candidates for this study. However, as mentioned in section 3.2, since the researcher does not speak and/or read languages other than Hebrew and English, a working knowledge of Hebrew only was set as an inclusion criterion for the parents. This limited the number of potential subjects since it would have added significant difficulties to analyze the parents' questionnaires or interviews in other languages.

One subject completed only 11 sessions out of 16 due to a difficult phase she was going through at that time (see section 3.2). According to a discussion of her problems with the social worker in an attempt to find solutions for her lack of cooperation, it may have been that her special background as an adopted child, was affecting her behavior. In addition, her parents refused to be interviewed (see explanation in section 3.8.3.3). Therefore, not including a criterion related to the special background of a child in the inclusion criteria was a limitation and should be carefully considered in future studies, especially those that involve a relatively long period of clinical trials such as four months, as in the current study.

As mentioned in section 3.2, the children included in this study were drawn from educational centers which differ in their language acquisition philosophies. A within-subjects design compensates for possible differences between subjects. In a larger study any differences in acquisition of communication skills over time between children who receive different educational approaches should be considered and added in to the reporting of results.

***Limitations of measurement/assessment tools:*** The Infant/Toddler Sensory Profile which was used as an additional screening tool for the subjects has not been standardized for children with CI (see section 3.4.1). This may be considered a limitation though using it was effective.

Another assessment tool was the Parent-Child ERA which was used to address the issue of potential bias due to the therapist's intentions in the dual role of therapist and researcher. Using this tool may considered a limitation since it has not been tested on children with disabilities and was not designed to assess interactions between a parent with normal hearing and a child with CI (see section 3.4.4). However, it was a useful tool for this study. The percentage agreement reliability between the two independent observers (72.14% or 94.25%; see section 4.1.3.1) indicated that there

was a high level of agreement between them although it was the first time that each of them used this tool to rate such an interaction. This increased the internal validity of the current study.

An additional limitation is the validity and reliability of the questionnaires, which could be influenced by three factors (discussed in section 5.3): Pre-testing of the questionnaires with only one family, the actual questions and their phrasing, the administering of the questionnaires, and biased results from the parents. Regarding the use of the Likert scale, the simplicity and ease of use of this scale is its strength, though it has two limitations: "Different combinations of several scale items can bring about the same overall score or result, and the response set<sup>50</sup> is a potential danger" (Neuman, 2006, p. 210).

***Limitations of equipment/material:*** As detailed in section 3.5.3.1, the sessions were recorded by using two video cameras, placed on two tripods, to ensure the widest possible coverage of the activity within the room. They were carried by the researcher from one setting to the other, and were used in all of the three settings where this study was carried out. There were very few occasions when the two cameras could not capture a child who had moved far away from the area where the toys and games or the music equipment was placed. At these moments, there was usually no interaction going on between the child and the therapist. If there was vocal interaction, it could have been coded anyhow through listening, without watching it visually. Therefore, it actually did not affect the coding. Another technical problem related to the area covered by the cameras was if the researcher was engaged in an interaction with the child while standing up and in this position could be covered as well by the cameras. Another technical problem related to the area covered by the cameras was whether the cameras could capture an interaction with the child if the therapist was standing up. Since this was impossible, the therapist resorted to kneeling or sitting within the range of the cameras. Though it may have looked to observers as an unnatural situation had they watched all or part of the sessions, it did not affect the coding process because these positions were carried out in all the music therapy and play sessions.

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<sup>50</sup> Response set, also called *response style* and *response bias*, is "a tendency to agree with every question in a series rather than carefully thinking through one's answer to each" (Neuman, 2006, p. 208).

### **5.6.3 Limitations of target behaviors**

Originally, the researcher's intention was to investigate also whether there would be differences between the children's vocal output in play and music therapy due to the importance of enhancing vocalizations after the implantation. An audio analysis expert stated that because of difficulties such as background noise, echo in the room, noise made by the toys/musical instruments, and mixing of the researcher's voice with the child's voice, it was impossible to analyze the children's vocalizations.

Another limitation was the fact that the coding of the children's spontaneous communicative interactions such as imitation, initiation, or turn-taking was done without differentiating whether it was vocal, instrumental, gesture, etc.

### **5.7 Clinical and family-based applications**

The findings of this study have specific implications for music therapists/educators who work with children with CI. The flexible protocol in Appendix A that was applied in this study comprehensively describes different music experiences (with the rationale for each experience and its procedures), which enables the gradual exposure of these children to music, and thus to this medium of communication. There are some recommendations derived from this study, for the above mentioned professionals that are appropriate for promoting communication in a mutually enjoyable interaction with young children following cochlear implantation. These recommendations are applicable to clinical practice as well as research and are as follows:

- The use of vocalizations such as short rhythm chants, nonsense syllables, laughter, etc., with variations of the voice timbre, intonation, and speed
- Exploring different sounds of musical instruments using different tempi and dynamics as well as other speech parameters such as rhythm, duration, accent, and pause
- Listening to recordings of a soloist performing songs with short and simple words and only basic musical elements such as rhythm and melody. (see Appendix A)

These recommendations are suggested in addition to Gfeller's (2000) useful recommendations such as playing music at soft to moderate intensity and



emphasizing tasks that are based on rhythmic structures of music (see Appendix A, section A.1). The protocol also describes the two different approaches (directed vs. undirected) employed in the study and the importance of the undirected approach for music therapists, other professionals, and families. This issue will be elaborated on later in this section.

As a result of the findings from this study, there may also be the potential to apply the methods detailed in the protocol to helping enhance the communication skills of children who have similar problems in this area.

The children in this study were in the age range of two to three years old. Marschark and Spencer (2003) call the first three years of life the "magic years", and emphasized the power of early life experiences on later development in all areas. Edwards and Crocker (2007) relate to behavioral and emotional disorders among deaf children and state that the one theme underpinning these issues is that effective communication between children who are deaf and their parents is essential. In addition, they stress the importance of the children's communication with their wider community. These two references and the ones detailed in section 2.2.7, point out the paramount importance of early intervention and effective communication.

During the interview, most parents expressed their interest in applying different experiences they saw in music therapy, either from what they had learned by attending the sessions or by watching the video clips (for the ones who did not attend the sessions). Some experiences they mentioned were: Communicating through the use of simple percussion instruments, listening to recorded songs that have only a melodic line accompaniment and identifying the associated picture, having vocalized conversations, and playing vocally-based rhythm games. According to what the parents reported in the interviews, it appeared that they understood the additional option that this study has opened up for them of using music as a non-threatening media through which they could communicate with their child and enjoy the process. A specific example is Ay's mother, who indicated that she had never thought about communicating enjoyably with her child by vocalizing, using nonsense syllables, or playing rhythmic games rather than pressuring her to speak. She differentiated between her way of playing with Ay and the therapist's way and acknowledged the importance of the undirected approach towards Ay as something that provided Ay with more opportunities for control and increased her spontaneous communication. Ay's mother tried to engage in an undirected approach in free play with her daughters

at home and indicated their enjoyable communication. Thus, the most important practical implication deriving from the findings of this study both from the objective data and from the parents' responses is that the music therapist may sensitively, attentively, and in a non-authoritative manner suggest to the parents, who are the primary intervention agents (see Prizant, Wetherby, & Roberts, 2000), some ways to be engaged in non-verbal communication with their children, and incorporate music into their life while they are acquiring language and speech. The music therapist may serve as the mediator between the child and the parent<sup>51</sup> by modeling for the parent different experiences that may be implemented at home. As a result, the child may have more opportunities for practicing normal communicative interactions with the parent, and may be reinforced for his/her non-verbal as well as verbal exchange and response. This may reduce stress and frustration, and make the child feel more competent and self confident, which in turn, may serve as the catalyst for an additional motivational circle of communication with the parent<sup>52</sup>. Implementing these experiences at home does not require any special musical skills on the parent's part. Oldfield (2006) indicates that some mothers can experience jealousy when they see their child communicates more readily through music than when the mother tries to communicate verbally. In such cases, Oldfield emphasizes the fact that it is the music making with the therapist that the child is reacting to, and she tries to encourage the mother, herself, to use music.

Such pre-school home intervention should be employed as early as possible due to the brain neuroplasticity (see section 2.2.7) which contributes to the rapid changes in this period of time as well as the psychological implications that such intervention may have. The purpose of early intervention is to maximize the child's psychosocial and educational development. In addition, as the age of implantation is lowered, this emphasizes the necessity for the music therapist to be well versed in early infant development.

Improved communication with the child may also have a positive effect on the parent's stress level. Pipp-Siegel, Sedey, and Yoshinaga-Itano (2002) state that less stress has potential implications for more secure attachment.

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<sup>51</sup> The word 'parent' may include other primary caregivers as necessary.

<sup>52</sup> The ability of the parent to implement at home different experiences derived from the music therapy sessions is partly related to the parent's ability for playfulness (Moran, 1987), i.e., the ability to generate mutual pleasure by playfully gaining the child's cooperation and thereby reducing the lack of pleasure associated with frustration.

A study by Anagnostou, Graham, and Crocker (2007) looked at parental emotions following cochlear implantation. The authors found that grief is the strongest emotional condition that parents experience before and up to two years after implantation, alongside family adjustments. Grief has implications for the family's level of engagement during the assessment and habilitation stages. Attending music therapy sessions and watching the child being engaged with music following cochlear implantation does not heal the parents' wound, but may be valuable in lessening the grief a little and bringing some hope for the child's future development. An example which demonstrates this is Ay's mother, who waited eagerly every week for the music therapy session since it was the most enjoyable time for her during the week, watching her child being engaged with music (see section 5.9). Oldfield (2006) refers to the fact that the work in music therapy can focus on things that the child *can* do rather than on the difficulties they may experience, and therefore many mothers, who are often exhausted and may feel low in mood enjoy attending the music therapy sessions. The mothers treasure the joyful interactive play and use those moments as anchors when the inevitable struggles of daily life arise. Although Oldfield refers to children within the autism spectrum disorder, this applies to early childhood interventions in general as well as specifically to this study.

The above study by Anagnostou et al. (2007) also found that fathers use the defense mechanism of denial more than mothers. This finding may be explained by the fact that fathers have higher expectations of their children, or that mothers spend more time with their children, thus understanding the situation more quickly. In terms of clinical work, the authors recommend that professionals try to help by getting the fathers to be engaged and involved in the child's assessment and habilitation process. Referring to clinical implications derived from the current study, it is highly recommended that whenever possible, the therapist allots time for meeting with both parents to discuss various aspects of the sessions, so that the father as well as the mother may derive the most benefit for increased communication with the child, which results in strengthening the relationship.

As previously mentioned, one more important implication for parents and music therapists as well as other clinicians is the fact that an undirected approach was preferable to a directed one in enhancing spontaneous communication of the children in this study (see also section 5.2.2 for references). Oldfield (2006) states that "children with severe physical and mental difficulties usually have very little control

over any aspects of their lives and have far fewer opportunities to make choices than other children" (p. 111). A child with a disability in general, or with deafness in this case, is dependent upon the ones who can anticipate his/her needs. In this study, the children's need for control was evident during the sessions. It is important that parents learn to balance between using the undirected approach and following the lead of the child or being more directive and initiating communication with the child. The undirected approach allows the children to be in control of the dialogue and influence the mutual exchange with the parents and thus increase their spontaneous communication. Since Israel is a multicultural country, there is a diversity of sectors which differ in their religious beliefs and values. Therefore, some parents will find it more difficult to follow an undirected approach and offer the space necessary for the child to initiate communication than others. In addition, parents of a child with disability are often overly concerned about the child's progress. As detailed in section 2.2.3, mothers of children with hearing impairments tend to over-teach. It is important that mothers become aware of starting "where the child is" without feeling internally driven to force the child into a preconceived mold and above all – that they enjoy this approach to communication with their child.

Consistent with Kim's finding in her doctoral research on children within the autism spectrum disorder (Kim, 2006), the video analysis of the mother-child play interaction in the current study revealed that due to the increased responsiveness of the children, some mothers changed their approach to their children over time during the clinical trials after watching the therapist work with them, by reducing their level of structuring, initiation, and active directions and were more responsive to the behavioral cues and focus of attention of the child.

As in all early intervention programs, the parents are the central figures who may enhance the child's development by creating an appropriate environment in a timely manner. Since, in this study, the therapist's affect attunement turned out to be crucial in achieving and maintaining increased spontaneous communicative interactions, so will attunement behaviors on the part of the parent serve as a motivational factor for increased communication.

Many of the tenets of Rogers' (1951) humanistic client-centered approach, followed by the therapist in both the music therapy and the play conditions in this study (detailed in section 3.8.2.1.2), had bearing on the enhancement of the children's

spontaneous communication. Rogers' approach is highly recommended for clinical practice as well as research.

In addition to the use of the treatment protocol, other methods from this study which may be applicable to clinical practice and research for assessing the children's spontaneous communication are those regarding session analysis. The target behaviors selected for this study (spontaneous imitation initiation, turn-taking, and synchronization) are clinically relevant and valuable when referring to the issue of spontaneous communicative interactions of these children or, as previously mentioned, of other children with difficulties in this area. These behaviors are easily observable in session recordings. However, video/DVD analysis is an exceptionally time-consuming task which requires (a) good quality video cameras as well as experience with video recording, and (b) intensive training with the coding guidelines, which demands a high level of concentration and vigilance due to the repeated observations needed to accurately code the frequency and/or duration of these behaviors (see Appendix P). This is critical in order to reach a satisfactory inter-observer reliability. Due to the amount of work needed for this analysis, it may be applicable only to clinicians who undertake a research study on this topic.

### **5.8 Directions for further research**

Since the results for the five children in this study were encouraging, establishing conclusive evidence of the effect of music therapy on the spontaneous communicative interactions of children with CI requires a replication of this study with a larger sample. Recruiting young children receiving CI is difficult due to its low incidence in the population, let alone reaching a satisfactory sample size of these who meet inclusion criteria. This could be achieved by carrying out multi-site studies to increase test power and external validity. In addition, the number of potential subjects can be enlarged in replicated studies if therapists and researchers, who have a working knowledge of languages other than Hebrew and English, carry out the clinical work as well as the analysis of the questionnaires and the interviews.

In a larger study, researchers should take into consideration the differences in acquisition of communicative skills over time between children who receive different educational approaches, and report it in the results.

Enlarging the sample size may enable investigating differences or similarities between communicative interactions of boys vs. girls in music therapy and play.

The protocol as well as the coding guidelines used in this study proved to be effective. As such, they are both recommended for use in replications. Researchers and their assistants should be intensively trained with the coding guidelines in future studies, thus, increasing treatment fidelity. Such coding can be refined by noting whether each communicative interaction is vocal, instrumental, gestural, or verbal. As mentioned in section 5.5.3, this study did not look at the vocal output of the children but future studies could investigate the effect of music therapy on vocalization. As stated in section 1.2, vocal experiences may serve as a channel for expressing emotions, and discovering the voice without the demands of speech and articulation. In addition, practice in using the voice is the foundation for ongoing development of speech and articulation in these children.

Although in the current study one of the inclusion criteria was 'no other known disability besides deafness', the lack of cooperation of one child (who apparently had no additional problems) draws attention to the importance of the screening process in general and of this population, in particular. Many children who are deaf are at greater risk than their peers with normal hearing for psychosocial maladjustment as well as behavioral disorders and other problems (Edwards & Crocker, 2008). This should be carefully considered in the future while setting the inclusion criteria and then refining the screening process as much as possible. Inclusion of children with additional problems besides deafness may sometimes result in a child's lack of persistent cooperation throughout the clinical trials, affect the family reaction to the study, and finally, may bias the results. Hopefully, screening instruments designed specifically for use with children who are deaf will be standardized and available in the future and will assist in this delicate screening process.

It is highly recommended that a caregiver attend all clinical trials. As mentioned in section 5.7, caregivers may learn to implement at home with their young children the music activities carried out during the sessions and to follow the modeled behavior of the therapist as she relates to the child. This may enhance further communication with their child. This will be the real life benefit. If the caregiver cannot attend the sessions, a larger sample will enable the evaluation of differences or similarities in the frequency and/or duration of spontaneous communicative interactions of children whose mothers attended the sessions and those whose mothers did not.

In future studies it would be preferable to use video cameras that ensure full

coverage of the activity in the room so that no child-therapist interaction will be missed due to only partial coverage. In accordance with what is required and felt by the therapist for developing more and longer interactions, it will also enable the therapist to move freely and naturally around the room rather than being restricted to sitting or kneeling in a circumscribed area.

In order to strengthen the validity and reliability of the pre and post-intervention questionnaires, it is recommended in future studies to review them with more professionals who work with this population as well as pre-testing it with more families. These steps undertaken as well as the enlargement of the sample size will provide stronger database regarding the differences/similarities between the parent pre and post-intervention questionnaires, i.e., whether there were any changes in the way each parent relates to and perceives the child's involvement and enjoyment prior to the beginning of the study and on its completion.

Parent interviews can be carried out either as semi-structured or structured ones, taking into consideration the pros and cons of each type of interview (see section 3.4.5) as well the abilities of the interviewer.

The findings indicated that music therapy as implemented in this study was beneficial for these children. Though the music interaction with the therapist was a key factor in the children's motivation to communicate, this researcher's personal interest is to carry out a further study to investigate the effect of the music therapy intervention on the children's spontaneous communicative interactions with the caregiver at home. This would require that the caregiver attend all sessions, learn from the therapist's modeled behavior during the sessions and receive guidance from the therapist.

## **5.9 Reflection on the doctoral research process**

Undertaking a doctoral research training was, for me, a learning process, a challenge in many ways and a very personal experience. It started with the dilemma of whether to carry out a study in a different area than I had previously explored, one that I would find interesting and appealing though completely new, or to return to the familiar and further deepen my knowledge in an area which related to my master's dissertation. I struggled with ambivalence over the advantages of 'knowing more' as a starting point along with the fear of getting bored for a few years by familiar material, vs. feeling the excitement and adrenalin of getting into a whole new area, which

brought with it the disadvantage of 'knowing nothing' as well as the fear of having to invest innumerable hours to learn the new. After much deliberation, I finally decided to investigate an area which embraced both something that was clinically familiar and 'homey' and offered me the opportunity to delve into a new aspect of childhood deafness - namely children with cochlear implants.

Each stage during this process had its challenges. Building up the research questions, the target behaviors and the method was a slow, arduous process but one that finally paid off. Recruiting the subjects within a time limit sometimes seemed like an almost impossible task and resulted in having to carry out the study in three different settings for five children. Every dropout was quite traumatic. The field work, which lasted about four months for each child, demanded that no stone be left unturned, together with patience, persistence, and the ability to adapt to frequently unexpected situations that arose. In the course of time, the initial vagueness, anxiety, and lack of control which I had undergone were replaced by clarity, a growing sense of mastery and peace of mind.

During the clinical work, there were many exciting and rewarding moments, especially when the children showed their enthusiasm, excitement, joy, and pleasure in the music therapy sessions. There were also rewarding moments from the perspective of the parents. Some of them saw the child's enjoyment and excitement during the music therapy sessions and tried to implement similar experiences at home. Others, who did not attend the sessions, told me with satisfaction that the kindergarten teacher or the person who attended the sessions with the child, had reported to them about their child's enjoyment in music therapy. One father, who replaced the mother during one session, told me secretly that the mother waited eagerly every week for the music therapy session since it was the most enjoyable time for her during the week, watching her child being engaged with music. On the other hand, there was also one negative response from parents who directed some of their distress and frustration at me due to their child's difficult time, which resulted in her lack of cooperation. Feelings such as frustration, anger, sadness, lack of control, insult, and fear of losing more subjects emerged as a consequence, anxieties which I found incumbent upon me to manage.

The ethnographic aspect of my field work was another new experience which proved quite dramatic. Being a therapist in three different settings, one of which was very religious (Orthodox Jews), opened a new world for me, one which I had never



encountered before. Though I felt the need for an adjustment and learning period regarding this new socio-cultural world, there was no lengthy time for this since the study was scheduled to begin. The familiarization sessions were the first step into this different world. In order to do the field work there, I had to respect and abide by their rules with no possibility of their reciprocation to my secular world in such matters. The old saying: "When in Rome, do as the Romans do" was very real for me there. The experience was both physical and emotional, including:

- the clothes I was required to wear (very modest attire, which included high necklines, long sleeves, and long skirts or dresses);
- the restrictions on my singing during the music therapy sessions when the father was in attendance instead of the mother (hearing a woman's voice is considered indecent);
- the restrictions on a man being alone in a closed room with a woman other than his wife;
- the refusal of one father to watch his child interacting with me on the DVD because I, a woman, am in it;
- the informative conversations with the mother about it.

Though this was not an ethnographic study, it certainly had ethnographic characteristics in terms of my being a direct observer and a participant in a community which had very different cultural codes than mine. I found myself watching what was happening, listening to what was being said and asking questions. Among ethnographers, there is a claim that marginal figures<sup>53</sup> are those who easily build a relationship with the researcher and because of their marginality they enable the researcher to view that society sober-minded (Shokeid, 1988). In this research the marginal figure was the clinical social worker (who interviewed the parents) who helped me throughout this period by explaining to me the values and traditions of this very religious community.

During my development as a researcher I was challenged by learning and mastering different skills for the first time, such as video recording and analysis, analyzing qualitative data, using new software, using a new program for statistical

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<sup>53</sup> 'Marginal figure' in this context describes an outsider, a person who is loosely affiliated to a group without fully belonging to it and being fully committed to all its tenets.

analysis, and improving my computer knowledge. The personal aspect was inherent to the process and included exploring the uncertainties, experiencing the vicissitudes of different emotions, putting to test different personal needs, and even surviving a Middle East war right on my own doorstep in 2006, during which I was very upset, unable to concentrate and to have the free mind needed for writing and creating.

There were a few issues that accompanied me throughout this process. One of them was the different hats I wore simultaneously: a researcher and a therapist, and as a therapist in the two conditions in this study. There was an ongoing, mutual influence between these different roles. However, I tried to be aware of this and did my best to keep each role's identity separate from the other. I enjoyed the fact that I had to be the therapist who investigates her own clinical work by analyzing the videos. It enabled me to take the distance and watch certain aspects of this work from a more objective perspective (although the post-modernistic advocates will claim that there is no such thing as objective without taking into consideration the researcher's point of view). In addition, being the therapist in the intervention as well as in the control condition was a challenge for me as a therapist and a researcher in terms of the similar affective and behavioral characteristics that I tried to demonstrate in the two session parts in both conditions in order to avoid bias.

Another interesting issue was the question of whether becoming a researcher affected me as a clinician, or more specifically, whether it made me a better music therapist in general. I found that the process enlarged and enhanced my clinical perspective by causing me to relate more deeply and to sharpen different issues and dilemmas, taking into consideration more aspects that may have been underestimated and trying to make each decision by weighing cautiously its profit and loss account.

The PhD program was another factor which contributed to my development as a researcher. To be part of a program that is dedicated to music therapy specifically was a great privilege. It provided me the opportunity to be in very active dialogue with colleagues from all over the world. It definitely broadened my perspectives and helped me to elaborate on different issues raised by me and my colleagues throughout the discussions of my presentations and theirs, held in the PhD courses. I have learned that many times there is no single way to approach a specific issue in research and there are no recipes in the 'one size fits all' category. I had to find my own way, while being supported by my supervisor and whoever else was involved in this process.

I very much believe in my profession. The fact that the results were encouraging for these five subjects not only warmed and gratified me personally but also as a member of the music therapy community. I am aware of the fact that not all professionals respect and accept us, the music therapists, with an equal level of acknowledgement; on the contrary, many times they demonstrate their suspiciousness. We are still paving our road and I have no doubt that this certainly affected my motivation regarding this study. As I indicated in section 1.3 in relation to evidenced-based practice, I feel and have always felt the need, or one might say, even the 'mission', to further validate music therapy by demonstrable outcomes from clinically based research that would support the efficacy of a music therapy intervention. In 2006, I was privileged to be invited to an international conference on cochlear implants (Kerem, 2006), to present my study (in its initial stages at that time) to professionals, mainly medical doctors, audiologists, and speech and language therapists, who had never before been exposed to music therapy in general or specifically, to the topic of my study. Within the numerous presentations, there were only two that related to music and CI- one on music perception and CI and mine. This indicated to me how much more work needs to be done to investigate the possible benefits of music therapy to the social-emotional development of these children followed by sharing the material with other professionals. Unfortunately, at that stage I still did not have any results to present.

One of the most rewarding outcomes of my study is the fact that some of the families have maintained contact with me and update me on their children's development. Appendix Y- Parental anecdotes- contains some poignant and often humorous examples of their children's experiences with their CI. These anecdotes were shared with me approximately one year after the conclusion of the clinical trials.

I have no doubt that the person who started this process and the one who is concluding it, is not the same one in the sense of the kaleidoscopic prism through which I am looking now.

## **5.10 Conclusion**

This controlled study examines the effect of music therapy on spontaneous communicative interactions of five young children with CI, using primarily a quantitative investigation, supported by additional qualitative enquiry. The results suggest that-

1. Music therapy enhances spontaneous imitation, initiation, turn-taking, and synchronization of these children to a much greater degree than play.
2. The undirected session part in both music therapy and in play enhances spontaneous turn-taking and increases the number of events of spontaneous turn-taking to a greater degree than the directed part. Since no interaction was found for *condition* with *session part*, the findings imply that the undirected session part of the music therapy sessions enhances spontaneous turn-taking and increases the number of events of spontaneous turn-taking more than the directed part.
3. The parents acknowledged the importance of music therapy and were interested in applying different music activities.

This study adds to the existing material and scientific knowledge in this area. It further validates music therapy by demonstrable outcomes from clinically-based research that supports the efficacy of a music therapy intervention.

The encouraging findings for these five children suggest that-

1. Music therapy intervention, as implemented in this study, could be integrated into a total habilitation program for young children with CI.
2. Parents and educators can be given concrete recommendations regarding (a) exposure of these children to the world of musical sounds and the use of music for communication, and (b) the value and usefulness of an undirected approach balanced with more directive techniques.

Voltaire, the French philosopher, wrote that "the ear is the avenue to the heart". The findings of this study confirm Voltaire's words and emphasize the unique contribution of music therapy for the overall potential development of other children with CI.



## English summary

A review of the literature reveals that children with severe to profound hearing loss who have undergone cochlear implantation can enjoy music and music activities. Most of the current research emphasizes perception of music by adults and school-age children with cochlear implant (CI), and their involvement with and enjoyment of music (Gfeller et al, 1999, 2000; Stordahl, 2002), while only a few focus on music habilitation programs. Several studies and anecdotal reports indicate increased communicative responses as a result of music therapy carried out primarily with children with developmental disabilities (e.g., Wigram, Pederson & Bonde, 2002; Kim, 2006). The purpose of this study, therefore, was to investigate the effect of music therapy (MT) on spontaneous communicative interactions (imitation, initiation, turn-taking, and synchronization) of 2-3-year-old children following cochlear implantation. These behaviors are essential prerequisites to developing language. An additional purpose was to gather information from each parent regarding the child's engagement in and enjoyment of music in daily experiences before and after the MT intervention.

### *Primary research question (Quantitative data):*

Does music therapy enhance spontaneous communicative interactions of young children, following cochlear implantation?

#### *Sub-question:*

Among these children, is the frequency and/or duration of spontaneous communicative interactions significantly greater in *undirected*<sup>54</sup> or *directed* music and play experiences?

### *Supplementary research questions related to parent questionnaires (quantitative and qualitative data)*

How does each parent describe the child's engagement in and enjoyment of music in daily experiences before and after the music therapy intervention?

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<sup>54</sup> The undirected and directed approaches are explained in the Method chapter, section 3.7.

*Sub-questions:*

1. Are there significant differences between the answers of the mothers compared to those of the fathers in the pre- and post-intervention questionnaires?
2. Are there common themes in the free-text answers of the mothers compared to those of the fathers, and what is their incidence?

*Supplementary research questions related to parent interviews (qualitative data)*

What are each parent's reflections and thoughts in relation to the child's participation in music therapy after watching short video clips from the music therapy intervention?

*Sub-questions:*

1. Are there certain common themes that emerge and can be identified in the interviews held separately with mothers and fathers?
2. Are there quantitative and qualitative differences between the themes that appear in the mothers' interviews compared to the fathers' interviews?

**Method*****Research design***

This study utilized mixed methods (the embedded experimental model; Creswell & Plano Clark, 2007). It was carried out primarily as a quantitative study, defining observable and measurable behaviors of the subjects, and collecting quantitative data from parents' questionnaires. The study also incorporated qualitative research tools utilizing thematic analysis of interviews as well as analysis of narrative material from semi-structured interviews and questionnaires with parents in order to provide additional relevant information to further inform the quantitative results. The study was an in depth multiple case study, based on five subjects, comparing responses within subjects and between conditions (Barlow & Hersen, 1984; Cooper et al, 1987). An A-B-A-B crossover design, with subjects randomized to order, was used. Condition 'A', the control, was four sessions of play, and included different toys and games. Condition 'B' was four sessions of MT, which always included exploring percussion instruments, vocal games, and listening to simple recorded songs.

The subjects were randomly assigned to receive MT and play in counterbalanced order to control for order effects. Each condition, either MT or play, consisted of four 20 minute weekly sessions. Ten minutes of each session were directed by the

therapist (therapist-led) and ten minutes were undirected by her (child-led) (see section 3.7 for definitions). The first session in each stage ('A' or 'B') always started with the directed activities. To minimize order effects, subsequent sessions alternated the order of the undirected and directed parts. Video examples of the directed and undirected session parts as well as the target behaviors in both conditions are presented in the DVD accompanying the thesis.

Since the researcher also served as the therapist for all conditions, a written protocol was established, which offered a clear procedure, accompanied by guidelines and specific techniques for use in both the MT and play sessions. It structured the procedures for the therapist during the directed part of the sessions but at the same time was relatively flexible to be tailored to the child's individual needs and ability. To further address the issue of potential bias caused due to the therapist's intentions in her dual role, a procedure was administered to evaluate her interactions with the subjects in both conditions. All sessions were videotaped. Frequency and/or duration data of the target behaviors in MT and play were reviewed on DVD's, notated on a coding sheet and analyzed. For spontaneous initiation and imitation, only frequency scores were collected for analysis, while for turn-taking and synchronization both frequency and duration scores were collected. The number of events of turn-taking was recorded.

### ***Subjects and setting***

Inclusion criteria for each child:

1. Age between two to three years old;
2. No other known disability besides deafness;
3. Speech awareness threshold no poorer than 40 dB *with* the CI.

In addition, the parents completed a questionnaire called "The Infant/Toddler's Sensory Profile" (Dunn, 1997, 1999), which evaluates the child's sensory processing abilities and how these abilities support or interfere with functional performance. Only children, who scored within the normal range, were considered for inclusion in this study.

The inclusion criteria for each parent were:

1. Normal hearing;
2. A working knowledge of Hebrew;



3. No cognitive or psychological impairments of any kind, e.g., mental retardation, alcoholism, etc.

Five children (4f, 1m) participated in the clinical trials, carried out in Israel at three centers for children with hearing impairments. Three girls and the boy completed all 16 sessions while one girl, Z, completed only 11 sessions due to her lack of cooperation.

### ***Measurements/assessment tools***

Both standardized tools (The Infant/Toddler Sensory Profile-Clinical Edition, and Parent-Child Early Relational Assessment) and non-standardized tools (parent pre and post-intervention questionnaire, parent semi-structured interview, and DVD analysis) were used for different analyses as well as assessment of the children's spontaneous communicative interactions.

### ***Therapeutic approach***

The researcher employed many of the tenets of Carl Rogers' (1951) client-centered approach in both the MT and the play conditions.

### ***Procedure***

The field work in this study was divided into three phases:

1. Phase I: Pre-intervention procedures (Recruiting subjects, signing of parental consent forms, familiarization sessions of researcher with the subjects, and completing pre-intervention questionnaire);
2. Phase II: Research clinical trials;
3. Phase III: Post-intervention procedures (Completing the post-intervention questionnaire, choosing video clips for parent interviews and parent interviews).

### ***Data collection and analysis***

The quantitative data in this study were analyzed by using descriptive and inferential statistics. The qualitative data analysis included narratives and thematic analysis.

## Results

### *Reliability*

*Inter-observer reliability for the target behaviors:* With one exception for duration of spontaneous synchronization (0.76), all the ICC's (Intraclass Correlation Coefficients) were above 0.90.

*Inter-observer reliability related to independent variable session part (directed vs. undirected):* Cohen's Kappa for these nominal variables and was found to be 0.89.

*Analysis related to therapist's behavior:*

*Parent-Child Early Relational Assessment inter-observer reliability:* Two independent observers rated the therapist's interactions on 14 variables taken from this assessment. Percentage agreement reliability was found to be 72.14 % or 94.25%, due to two different methods found in the literature.

*Parent Child ERA analysis:* Additional analysis indicated that the affective and behavioral characteristics of the therapist were similar, consistent, and comparable when comparing the therapist's behavior in undirected and directed session parts in play with the undirected and directed MT session parts.

### *Effects of music therapy*

*Session analysis: Main effects and interaction:* The complete video recordings for all five children (75 sessions of 20 minutes each) were observed and analyzed by the researcher in order to answer the primary research question and its sub-question. All the dependent variables were analyzed according to seven questions. Each of these questions included six comparisons between the two conditions, music therapy and play. The dependent variables were analyzed by a Generalized Linear Mixed Model (GLMM) using Poisson distribution. The results of the main effects and interactions for session analysis revealed a significant effect ( $p < .001$ ) for all seven variables comparing the MT condition with the play condition. Comparing the independent variable *session part* (directed vs. undirected) yielded a significant effect for the *undirected session part* (either for MT or for play) for frequency of spontaneous turn-taking ( $p < .05$ ), duration of turn-taking ( $p < .001$ ), and number of events of turn-taking ( $p < .01$ ). No significant effect was found for the interaction of *condition* with *session part* for any of the variables. Due to the small sample size, the test power was relatively low, so the emphasis was on descriptive analysis which demonstrated the advantages of MT and the undirected session part in enhancing

communication of these five children. However, establishing conclusive evidence requires further research with a larger sample.

*Supplementary analyses of parent questionnaires:* The Likert-type questions and the 'yes/no' questions were analyzed using paired sample t-tests and Fisher's exact test, respectively. Neither tests showed a significant difference between the mothers' or the fathers' ratings/responses from pre to post on the parent questionnaires. Regarding the free-text answers, the information provided by the parents about their children's involvement with music in daily life was too diverse to discern similarities between children, or changes between pre-and post-intervention. Due to these difficulties, a case study narrative from the parents' comments and the interview material was written to describe each child's engagement and enjoyment of music in daily experiences and provide the reader with a deeper understanding and perspective of each parent's perception of their child.

*Supplementary qualitative analysis of parent interviews:* Each of seven parents (four mothers and three fathers) was independently interviewed after watching short video clips from the MT intervention. Three parents were not interviewed (for reasons see section 3.8.3.3). Thematic analysis was carried out on the transcribed interviews and six main themes were found. Analysis revealed that most parents were highly satisfied with the MT, and expressed interest in applying at home different activities that they saw during the sessions or in the video clips.

## **Discussion**

### ***Discussion of findings from session analysis***

Due to the small sample size, the generalizability of the findings, or the external validity, is limited to the subjects in this study. However, the results are sound enough to provide a platform to generate hypotheses for further studies in this field.

*The effect of music therapy vs. play:* MT clearly emerged as more effective than play in increasing particular spontaneous communicative interactions. A possible explanation relates to the fact that besides offering a non-verbal medium for communication, the children's experience in MT was a more affective one due to inherent emotional qualities in music. There was also evidence from the parent

interviews that pointed to the enjoyment and excitement their children showed during MT (see Appendix M). Other concepts from the developmental perspective of infant researchers such as affect attunement, vitality effects (Stern, 1985, 2000), and communicative musicality (Trevarthen & Malloch, 2002) are discussed in section 5.2.1.

*The effect of undirected vs. directed session part:* The fact that the undirected part in MT and play yielded greater frequency and longer duration of spontaneous turn-taking, and increased number of events of spontaneous turn-taking may be explained by the reduction of therapist's control in this session part (see section 5.2.2). Affect attunement as well as communicative musicality was also more evident in the undirected session part, since the child had the freedom to spontaneously initiate and structure the experiences, and the therapist had her freedom to 'dance' with the child and to respond in an adaptive and flexible way without having the protocol constraints of the directed part.

The undirected session part did not yield a significantly greater frequency and/or duration of the other target behaviors- imitation, initiation and synchronization. These findings are explained in section 5.2.2.

### ***Discussion of parent questionnaires***

The questionnaires did not provide enough data to strengthen the quantitative results in the video analysis; however, some of the themes in the case study narratives do talk to the value of MT for these children. Possible explanations for the inconclusive findings involve three factors (see section 5.3):

1. The actual questions and their phrasing;
2. The administration of the questionnaires;
3. Biased results from the respondents.

### ***Discussion of parent interviews***

Regarding the findings from the interviews, the following issues were raised in section 5.4:

- The interpersonal skills of an interviewer (Gall et al., 1999);
- The planned semi-structured interview vs. the actual structured one

undertaken;

- Miles and Huberman's approach (Robson, 2002) in relation to the way the thematic analysis was undertaken.

The thematic analysis, based on these seven interviews, was not originally intended to be a quantitative analysis; however, there were findings of particular interest such as-

- The high frequent themes (4b, 5c, and 6a) which actually support the quantitative results of the video analyses (see Appendix T for examples);
- The fact that the mothers contributed significantly more comments than the fathers;
- The difference between the fathers' and the mothers' involvement in regards to values, beliefs, life style, time spent at home with their children, and their attendance/non-attendance during the sessions.

### ***Discussion of protocol for music therapy and play sessions***

Using protocols in clinical practice and/or in MT research is rare (see Kim, 2006). The protocol in this study increased treatment fidelity and proved to be effective and beneficial. This supports Wigram's statement (2007) regarding the possible benefit of structured procedures which are consistent enough to be reliable but flexible enough to allow the therapist to respond to the child's needs rather than requiring the child to respond to the procedure (see section 5.5).

### ***Clinical and family-based applications***

The implications of the findings for music therapists/educators who work with children with CI refer to-

- the methods detailed in the protocol (Appendix A) to help enhance communication;
- the advantage of the undirected approach;
- the methods of session analysis;
- the Rogerian client-centered approach;
- the therapist's affect attunement as a crucial motivational factor.

Family-based applications relate to-

- recommendations regarding ways of incorporating music into the child's life and the use of music for communication;
- the value of the undirected approach and attunement behaviors.

### ***Limitations of the study***

The most obvious limitation of this study is the small sample size (five children), which limits the generalizability of the results. Other possible limitations (discussed in section 5.6) are the validity and reliability of the questionnaires, the potential for bias of the therapist/researcher, the number of parents who attended the sessions, and the possible influence of mothers learning from the modeled behavior of the therapist and implementing at home different experiences they have seen in the sessions.

### ***Directions for further research***

Since the results for the five children were encouraging, further research to establish conclusive evidence of the effect of MT on spontaneous communicative interactions of children with CI requires replication studies with larger samples, possibly by carrying out multi-site studies including therapists and researchers who have a working knowledge of languages other than Hebrew and English.

Different issues are examined and recommendations are made for further studies (see section 5.8), such as: The protocol, the coding guidelines for the target behaviors, the implications of different educational approaches, gender differences, careful consideration of inclusion criteria and refined screening process, appropriate screening instruments, the importance of the parent's attendance during the sessions, the investigation of vocal output, strengthening the validity and reliability of the pre and post-intervention questionnaires, and choice of parental interview methodology.

### ***Coda***

This in-depth multiple case study adds to the existing material and scientific knowledge in this area. It further validates the efficacy of a MT intervention by demonstrating and quantifying positive outcomes using clinically-based observations.

The encouraging findings for these five children suggest that a MT intervention, as implemented in this study, could provide an important supplement to a

communication habilitation program for young children with CI. Furthermore, parents and staff need to be given concrete guidelines regarding the exposure of these children to the world of musical sounds, the use of music for communication, and the importance of the undirected approach.

## Dansk resumé

Litteraturgennemgangen afdækkede, at børn med alvorlig til svært høretab, som har fået foretaget cochlear implant (CI), kan have fornøjelse af musik og musikalske aktiviteter. Størstedelen af den seneste forskning fremhæver musikopfattelsen hos voksne og børn i skolealderen med cochlear implant og deres involvering i og fornøjelse ved musik (Gfeller et al, 1999, 2000; Stordahl, 2002), mens kun få undersøgelser omhandler musik-habiliterings programmer. Adskillige undersøgelser og anekdotisk rapportering indikerer øget kommunikativ respons som resultat af musikterapi udført primært med børn med udviklingsmæssige funktionsevnenedsættelser (f.eks. Wigram, Pedersen & Bonde, 2002; Kim, 2006). Formålet med nærværende forskning var derfor at undersøge effekten af musikterapi (MT) på spontane kommunikative interaktioner (imitation, i-gang-sætning/'initiation', tur-tagning, og synkronisering) hos 2-3-årige børn efter cochlear implant. Disse adfærdsmønstre er essentielle forudsætninger for sproglig udvikling. Ydermere var formålet at indhente information fra hver forælder vedrørende barnets engagement i og fornøjelse ved musik i dagligdagen før og efter MT interventionen.

*Primært forskningsspørgsmål (Kvantitative data):*

Øger musikterapi småbørns spontane kommunikative interaktioner efter cochlear implant?

*Underspørgsmål:*

Er hyppigheden og/eller varigheden af spontane kommunikative interaktioner blandt disse børn signifikant større/længere i *ikke-styret (undirected<sup>1</sup>)* eller styret (*directed*) musik- og legeoplevelser?

*Supplerende forskningsspørgsmål relateret til forælder spørgeskemaer (kvantitative og kvalitative data)*

Hvordan beskriver den enkelte forælder barnets engagement i og fornøjelse ved musik i dagligdagen før og efter musikterapi interventionen?

*Underspørgsmål:*

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<sup>1</sup> Ikke-styret og styret tilgang er forklaret i Metodekapitlet, afsnit 3.7.



1. Er der signifikante forskelle mellem mødrenes og fædrenes svar i spørgeskemaerne før og efter intervention?
2. Er der fælles temaer i de åbne svar fra mødrene sammenlignet med fædrenes svar, og hvad er forekomsten i så fald af sådanne fælles temaer?

*Supplerende forskningsspørgsmål relateret til forælder interviews (kvalitative data)*

Hvilke refleksioner og tanker har den enkelte forælder i forhold til barnets deltagelse i musikterapi efter at have set korte videoklip af musikterapi-interventionen?

*Underspørgsmål:*

1. Opstår der bestemte fælles temaer, som kan identificeres i interviewene med mødre og fædre hver for sig?
2. Er der kvantitative og kvalitative forskelle mellem de temaer, som opstår i interviews med mødre og i interviews med fædre?

## **Metode**

### ***Forskningsdesign***

I denne undersøgelse anvendtes blandede metoder ('the embedded experimental model'; Creswell & Plano Clark, 2007). Den blev fortrinsvis udført som en kvantitativ undersøgelse, som definerede deltagernes observerbare og målbare adfærd og indhentede kvantitative data gennem forældre-spørgeskemaer. Undersøgelsen indbefattede desuden kvalitative forskningsmetoder i form af tematisk analyse af interviews såvel som analyse af narrativt materiale fra semi-strukturerede interviews med og spørgeskemaer til forældre med henblik på at fremskaffe relevant information som uddybning af de kvantitative resultater. Undersøgelsen var en dybtgående multiple-case baseret på fem deltagere og omfattede sammenligning af svar for hver deltager ('within subjects') og mellem forsøgsbetingelserne (Barlow & Hersen, 1984; Cooper et al., 1987). Der blev anvendt et A-B-A-B cross-over design, hvori deltagerne blev randomiseret til rækkefølgen. Betingelse 'A', kontrollen, bestod af fire sessioner leg, og inkluderede forskelligt legetøj og spil. Betingelse B' bestod af fire sessioner MT, som altid inkluderede udforskning af perkussion-instrumenter, lege med stemme og lytning til enkle, indspillede sange.

Deltagerne blev tilfældigt henvist til at få MT og leg i afbalanceret rækkefølge for at kontrollere for indflydelse fra rækkefølge. Hver forsøgsbetingelse, enten MT

eller leg, bestod af fire 20 minutters ugentlige sessioner. Ti minutter af hver session blev styret af terapeuten (terapeut-ledet), og ti minutter var ikke-styret af hende (barne-ledet) (se afsnit 3.7 for definitioner). Den første session i hver fase ('A' eller 'B') startede altid med de styrede aktiviteter. For at minimere 'order effects', skiftede rækkefølgen af de ikke-styrede og styrede sektioner i de efterfølgende sessioner. Video eksempler af de styrede og ikke-styrede sektioner såvel som den målte adfærd ('target behaviors') i begge forsøgsbetingelser er repræsenteret i den DVD, som er vedhæftet denne afhandling.

På baggrund af, at forskeren samtidig fungerede som terapeut i alle forsøgsbetingelser, blev der udarbejdet en skriftlig protokol, som angav en klar procedure ledsaget af retningslinier og specifikke teknikker til brug i både MT- og lege sessionerne. Protokollen strukturerede procedurerne for terapeuten under de styrede dele af sessionerne, men var samtidig tilpas fleksibel til at kunne tilpasses det enkelte barns behov og evner. For yderligere at behandle spørgsmålet om mulig bias fra terapeutens intentioner i kraft af hendes dobbeltrolle, blev en procedure fulgt, som evaluerede hendes interaktioner med deltagerne i begge forsøgsbetingelser. Alle sessionerne blev videooptaget. Data vedrørende hyppighed og/eller varighed af den målte adfærd i MT og leg blev gennemset på DVD'er, noteret på et kode-ark og analyseret. For spontan 'initiation' og imitation blev kun hyppigheds-scores indsamlet til analyse, mens både hyppighed og varigheds-scores blev indsamlet for tur-tagning og synkronisering. Antallet af tur-tagnings hændelser blev noteret.

### ***Deltagere og setting***

Inklusionskriterier for hvert barn:

1. Alder mellem to og tre år;
2. Ingen funktionsevnenedsættelse udover døvhed;
3. Talesproglig opmærksomheds-tærskel ('Speech awareness threshold') ikke ringere end 40 dB *med* CI.

Desuden udfyldte forældrene et spørgeskema kaldet "The Infant/Toddler's Sensory Profile" (Dunn, 1997, 1999), som evaluerer barnets evne til sansebearbejdning, og hvordan disse evner støtter eller forhindrer funktionel formåen. Kun børn, som scorede inden for normalområdet, blev overvejet til at deltage i denne undersøgelse.

Inklusionskriterierne for hver forælder var:

1. Normal hørelse;

2. Praktisk kendskab til hebraisk;
3. Ingen kognitive eller psykologiske handicaps af nogen art, f.eks. mental retardering, alkoholisme.

Fem børn (fire piger, en dreng) deltog i de kliniske forsøg, som blev gennemført i Israel på tre centre for børn med hørehandicaps. Tre piger og drengen gennemførte alle 16 sessioner, mens en pige, Z, kun gennemførte 11 sessioner på grund af hendes mangel på samarbejde.

### ***Instrumenter til måling og klinisk vurdering***

Både standardiserede ('The Infant/Toddler Sensory Profile-Clinical Edition, and Parent-Child Early Relational Assessment') og ikke-standardiserede instrumenter (forælder spørgeskema før og efter intervention, forælder semi-struktureret interview, og DVD analyse) blev anvendt til forskellige analyser såvel som klinisk vurdering af børnenes spontane kommunikative interaktioner.

### ***Terapeutisk tilgang***

Forskeren gjorde brug af mange af principperne i Carl Rogers' (1951) klient-centrerede tilgang i både MT og lege-betingelserne.

### ***Procedure***

Feltarbejdet i denne undersøgelse var inddelt i tre faser:

1. Fase I: Før-interventions procedurer (Rekruttere deltagere, indhente forældres underskrift af samtykkeerklæring, øvesessioner for forskeren med deltagerne, og udfyldelse af før-interventions-spørgeskema);
2. Fase II: Kliniske forsøg;
3. Fase III: Efter-interventions procedurer (Udfyldelse af efter-interventions spørgeskema, vælge videoklip til forælder interviews, og interviewe forældre).

### ***Data indsamling og analyser***

Kvantitative data i nærværende undersøgelse blev analyseret ved hjælp af deskriptiv og inferentiell statistik. Kvalitative dataanalyser inkluderede narrativ og tematisk analyse.

## Resultater

### *Pålidelighed*

*Pålidelighed mellem observatører af den målte adfærd:* Varigheden af spontan synkronisering var med én undtagelse (0.76) alle over ICC's ('Intraclass Correlation Coefficients') 0.90.

*Pålidelighed mellem observatører i forhold til uafhængig variabel - sessionsdel (styret i modsætning til ikke-styret):* 'Cohen's Kappa' for disse nominelle variable viste sig at være 0.89.

*Analyse i forhold til terapeutens adfærd:*

*Forælder-Barn 'Early Relational Assessment' (ERA) - pålidelighed mellem observatører:* To uafhængige observatører vurderede terapeutens interaktioner på 14 variable fra dette skema. Litteraturen viste, at baseret på to forskellige metoder var den procentvise overensstemmelse i pålidelighed mellem 72.14 % eller 94.25%.

*Forælder-Barn ERA analyse:* Yderligere analyse indikerede, at affektive og adfærdsmæssige karakteristika hos terapeuten var ens, konsistente og sammenlignelige, når terapeutens adfærd i ikke-styrede og styrede dele af en legesession sammenlignedes med ikke-styrede og styrede dele af en MT session.

### *Effekt af musikterapi*

*Sessionsanalyse: Hovedeffekt og interaktion:* Samtlige videooptagelser af alle fem børn (75 sessioner á 20 minutter) blev observeret og analyseret af forskeren med henblik på at kunne besvare det primære forskningsspørgsmål og dets underspørgsmål. Alle de afhængige variable blev analyseret ud fra syv spørgsmål. Hvert af disse spørgsmål omfattede seks sammenligninger mellem musikterapi og lege-betingelserne. De afhængige variable blev analyseret ved hjælp af en 'Generalized Linear Mixed Model' (GLMM), der anvendte 'Poisson' fordeling. Resultaterne af hovedeffekten og interaktionerne fra sessionsanalysen viste en signifikant effekt ( $p < .001$ ) for alle syv variable ved sammenligning af MT-betingelsen med legebetingelsen. Ved sammenligning af den uafhængige variable *sessionsdel* (styret vs. ikke-styret) gav en signifikant effekt for den *ikke-styrede sessionsdel* (både for MT og for leg) for hyppigheden af spontan tur-tagning ( $p < .05$ ), varighed af tur-tagning ( $p < .001$ ), og antallet af hændelser med tur-tagning ( $p < .01$ ). Ingen signifikant effekt blev fundet for indflydelsen af *forsøgsbetingelse* med *sessionsdel* på nogen variable. På grund af det lille deltagerudsnit var test-styrken

relativt lille, hvorfor vægten lå på deskriptiv analyse, som demonstrerede fordelene ved MT og den ikke-styrede del af sessionen i forhold til forbedring af disse fem børns kommunikation. Imidlertid er yderligere forskning med et større deltagerudsnit nødvendig for at kunne etablere endelig evidens.

*Supplerende analyser af forælder-spørgeskemaer:* Spørgsmålene af Likert-typen og 'ja/nej' spørgsmålene blev analyseret ved brug af henholdsvis parret t-tests og 'Fisher's exact test'. Ingen af disse tests viste en signifikant forskel mellem mødrenes eller fædrenes vurdering/svar fra før til efter intervention i forælder-spørgeskemaerne. Med hensyn til de åbne svar ('free-text answers') var den information, forældrene gav vedrørende deres børns beskæftigelse med musik i dagligdagen, for spredt til at opdage ligheder mellem børnene eller forandringer i før-og-efter-intervention. På grund af disse vanskeligheder blev et 'case study narrativ' skrevet ud fra forældrenes kommentarer og interviewmaterialet for at beskrive det enkelte barns engagement i og fornøjelse ved musik i dagligdagen og for at give læseren en dybere forståelse og et bredere perspektiv på hver forælders opfattelse af sit barn.

*Supplerende kvalitativ analyse af forælder-interviews:* Syv forældre (fire mødre og tre fædre) blev interviewet hver for sig efter at have set korte videoklip fra MT interventionen. Tre forældre blev ikke interviewet (se årsager hertil i afsnit 3.8.3.3). De transskriberede interviews blev udsat for tematisk analyse, og seks hovedtemaer blev fundet. Analysen afdækkede, at de fleste forældre var yderst tilfredse med MT og gav udtryk for interesse i at anvende forskellige aktiviteter hjemme, som de havde set enten i sessionerne eller i videoklippene.

## **Diskussion**

### ***Diskussion af resultater fra sessions analyse***

På grund af det lille deltagerantal er resultaternes generaliserbarhed, den eksterne validitet, begrænset til deltagerne i denne undersøgelse. Resultaterne er imidlertid tilstrækkeligt 'sunde' til at give en platform for genereringen af hypoteser for yderligere forskning inde for dette område.

*Effekten af musikterapi vs. leg:* MT viste sig klart mere effektiv end leg med hensyn til at øge særligt spontane kommunikative interaktioner. En mulig forklaring

vedrører det faktum, at udover at musik er et nonverbalt kommunikationsmiddel, var børnenes oplevelser i MT mere affektive på grund af de indbyggede følelsesmæssige kvaliteter i musik. Forælder-interviewene gav ligeledes dokumentation for den fornøjelse og glæde, som børnene viste i løbet af MT (se Bilag M). Andre koncepter fra forskning i småbørns udvikling såsom affekt-afstemning, vitalitets affekter (Stern, 1985, 2000) og kommunikativ musikalitet (Trevvarthen & Malloch, 2002) diskuteres i afsnit 5.2.1.

*Effekten af ikke-styret vs. styret session-del:* Det faktum, at den ikke-styrede del af MT og leg resulterede i større hyppighed og længere varighed af spontan tur-tagning og et øget antal hændelser med spontan tur-tagning, kan forklares ved reduktionen af terapeutens kontrol i denne del af sessionen (se afsnit 5.2.2). Affekt-afstemning såvel som kommunikativ musikalitet var ligeledes mere fremherskende i den ikke-styrede del af sessionen, idet barnet havde frihed til spontant at igangsætte og strukturere oplevelserne, og terapeuten havde sin frihed til at 'danse' med barnet og til at svare på en tilpasset og fleksibel måde uden at have protokollens begrænsninger fra den styrede del. Den ikke-styrede del af sessionen viste ikke signifikant større hyppighed og/eller varighed af de øvrige 'target behaviors' - imitation, initiation og synkronisering. Disse resultater er forklaret i afsnit 5.2.2.

### ***Diskussion af forælder-spørgeskemaer***

Spørgeskemaerne gav ikke tilstrækkelige data til at styrke de kvantitative resultater i video-analysen; imidlertid viser nogle af temaerne i casestudy narrativerne værdien af MT for disse børn. Mulige forklaringer på de ikke-endeligt konkluderbare resultater involverer tre faktorer (se afsnit 5.3):

- De faktiske spørgsmål og fraseringen af disse;
- Administrationen af spørgeskemaerne;
- Bias af resultaterne fra respondenterne.

### ***Diskussion af forælder interviews***

I forbindelse med resultaterne fra interviewene blev følgende temaer påpeget i afsnit 5.4:

- Interviewerens mellemmenneskelige evner (Gall et al., 1999);

- De planlagte semi-strukturerede interviews i modsætning til de interviews, der i realiteten blev udført som strukturerede interviews;
- Miles og Huberman's tilgang (Robson, 2002) i relation til den måde, hvorpå tematisk analyse blev foretaget.

Den tematiske analyse som baseret på disse syv interviews var ikke oprindeligt tænkt som værende en kvantitativ analyse; der var imidlertid særligt interessante resultater såsom:

- Temaer med høj hyppighed (4b, 5c, og 6a) som faktisk understøtter de kvantitative resultater af videoanalyserne (se eksempler i Bilag T);
- Det faktum at mødrene bidrog med signifikant flere kommentarer end fædrene;
- Forskellen mellem fædrenes og mødrenes involvering med hensyn til værdier, holdninger, livsstil, tidsforbrug hjemme med deres børn, og deres tilstedeværelse/ikke-tilstedeværelse i sessionerne.

### ***Diskussion af protokol for musikterapi og lege sessioner***

Anvendelse af protokoller i klinisk praksis og/eller i MT forskning er sjælden (se Kim, 2006). Protokollen i denne undersøgelse øgede behandlingens troværdighed og viste sig effektiv og udbytterig. Dette støtter Wigram's udsagn (2007) vedrørende den mulige nytte af strukturerede procedurer, som er tilstrækkeligt konsistente til at være pålidelige, men fleksible nok til at tillade terapeuten at imødekomme barnets behov snarere end at forlange, at barnet skal imødekomme proceduren (se afsnit 5.5).

### ***Klinisk og familiebaseret anvendelse***

Konsekvenserne af disse resultater for musikterapeuter/undervisere, som arbejder med børn med CI omhandler:

- Detaljeret beskrivelse i protokollen (Bilag A) af metoderne til at forbedre kommunikation;
- Fordelen ved den ikke-styrede tilgang;
- Sessions-analysemetoderne;
- Rogers' klient-centreret tilgang;
- Terapeutens affekt-afstemning som en meget afgørende motiverende faktor.

Familiebaseret anvendelse handler om:

- Anbefalinger vedrørende måder hvorpå musik inkorporeres i barnets liv og brugen af musik som kommunikation;
- Værdien af den ikke-styrede tilgang og afstemnings-adfærdsmønstre.

### ***Undersøgelsens begrænsninger***

Denne undersøgelses mest oplagte begrænsning er det lille deltagerantal (fem børn), hvilket begrænser muligheden for at generalisere resultaterne. Andre mulige begrænsninger blev diskuteret (se afsnit 5.6), såsom spørgeskemaernes validitet og pålidelighed, den mulige påvirkning (bias) af terapeuten/forskeren, antallet af forældre som overværede sessionerne og den mulige indflydelse af, at mødre lærte af terapeutens 'modellerede' adfærd og hjemme implementerede forskellige oplevelser, som de havde set i sessionerne.

### ***Retning for fremtidig forskning***

Da resultaterne for de fem børn var opmuntrende, vil fremtidig forskning for at etablere endelig evidens for effekten af MT på spontane kommunikative interaktioner hos børn med CI kræve gentagne undersøgelser med større deltagerudsnit, om muligt ved at gennemføre 'multi-site' undersøgelser, som inddrager terapeuter og forskere, som har praktisk kendskab til andre sprog end hebraisk og engelsk.

Forskellige temaer undersøges og anbefalinger gives for fremtidig forskning (se afsnit 5.8), såsom: Protokollen, kodningsretningslinierne for den målte adfærd, konsekvenserne for forskellige undervisningstilgange, kønsforskelle, grundig overvejelse af inklusions kriterier og en klar screeningproces, passende screeningsredskaber, vigtigheden af forælders tilstedeværelse i sessionerne, undersøgelsen af vokalt udbytte, styrkelse af før- og efter interventions-spørgeskemaernes validitet og pålidelighed, og valg af forælder-interviewmetode.

### ***Koda***

Denne dybtgående multiple-case undersøgelse bidrager til eksisterende materiale og videnskabelig viden på dette felt. Ydermere validerer den effektiviteten af en MT



intervention, idet den demonstrerer og kvantificerer positive resultater ved anvendelsen af klinisk baserede observationer.

De opmuntrende resultater for disse fem børn antyder at en MT intervention, som den der blev implementeret i nærværende undersøgelse, kunne være et vigtigt supplement til kommunikativ habilitering for småbørn med CI. Ydermere er det nødvendigt at give forældre og personale konkrete retningslinjer med hensyn til at udsætte disse børn for en verden af musikalske lyde, brugen af musik som kommunikation og vigtigheden af den ikke-styrede tilgang.

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## **Appendices**



## Appendix A

### Protocol for music therapy and play sessions

The manual used in this study was written by the researcher as a flexible protocol for the music therapy and the play sessions. It enabled the therapist to establish consistent and systematic procedures during the sessions. The two distinctive parts of each session, their design and the general principles and procedures that were common to both conditions were as follows:

- The sessions<sup>1</sup> were implemented once a week, usually on the same day and at the same time during the morning, except in the case of unusual circumstances.
- The researcher was also the therapist (reasons for this dual role appear in section 3.1).
- Each session lasted for 20 minutes and was divided into two parts: ten minutes of a directed part, which was therapist-led (i.e., initiated, guided, and structured by the therapist), and ten minutes of an undirected part, which was child-led (definitions of these two parts are given in section 3.7).
- The point of moving from the directed part of a session to the undirected one (or vice versa) was signaled by a digital timer.
- Each session took place in the same room, except in the case of unusual circumstances.
- The first session in each stage (music therapy or play) always began with the directed part, in order to provide these young children with supportive modeling and ease their transition from one condition to the next. To minimize order effects, subsequent sessions alternated the order of the undirected and directed parts.
- The number and variety of objects that could be utilized for expression, play and manipulation was similar in the music therapy condition and the play condition.
- The same musical instruments or toys and games were used in the directed part of the session as in the undirected part.
- To prevent novelty effect during the research trials, no new musical instruments or new toys and games were introduced to the child besides those that had been presented in the first session.
- Every session always opened with a greeting ritual ('hello' song in music therapy; verbal greeting, in play), and closed with a good-bye ritual (a good-bye song in music therapy; verbal good-bye in play).
- Mother attendance during all sessions was recommended if possible.
- All sessions were video taped by two video cameras.

The above procedures and principles provided these young children with the permanency and predictability that are necessary for developing feelings of security.

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<sup>1</sup> The word 'session' throughout this section will refer to either a music therapy session or a play session.

## A.1 Music therapy treatment protocol

For the music therapy treatment manual, the researcher used some of Gfeller's general practical suggestions (2000) for accommodating a child with a CI in music therapy or music education. She states that in music therapy, the therapist can introduce sounds in an exploratory way, and can make adjustments in response to the child's reactions. Thus, the experience may serve as an initial step towards more complete integration. Some of her recommendations for the therapist, that were appropriate for the young children in this study, are as follows<sup>2</sup>:

- "Learn how to turn the implant on and off, and how to control the volume";
- "Reduce to the extent possible extraneous noise in the listening environment";
- "Play music at soft to moderate intensity";
- "Emphasize tasks that are based on rhythmic structures of music";
- "Eliminate instructional objectives that require sound localization";
- "Determine individual preferences for particular musical instruments";
- "Present recorded music over quality stereo equipment";
- "Use visual aids to clarify concepts and musical information" (p. 128).

In the following sections are the definitions of the two session parts- directed and undirected, as well as the activities included in the directed part of the music therapy session.

### A.1.1 Music experiences not directed by therapist (10 minutes)

*Music experience not directed by therapist* (UM) is defined (see section 3.7) as an experience in which music therapist and child spontaneously engage in music activities predominately initiated and structured by the child. In this part of the session, the therapist responded to child-led activities, using imitation, turn-taking and matching<sup>3</sup> to support his<sup>4</sup> initiatives.

The child may spontaneously build a structure, or begin to organize the activity when seeing the therapist's preparedness to respond to his ideas or initiatives. Giving meaning to an experience initiated by the child acknowledges his ideas, which may add to his positive self-image. In addition, such an experience provides the child with an opportunity to exert control, which is so important to these children.

Experiences which were not directed by the therapist included free vocalizations, exploring with the instruments, and listening experiences. When the children occasionally initiated free vocalizations in the undirected part of the session, either in music therapy or in play, the therapist further developed it through an exploration of high/low tones, laughing, and vocal glissandi in order to enable the children to

<sup>2</sup> The recommendations presented are in a different order than they appeared in the original article.

<sup>3</sup> Matching (in music therapy): "Improvising music that is compatible, matches or fits in with the client's style of playing while maintaining the same tempo, dynamics, texture, quality and complexity of other musical elements." To achieve a 'match' in musical terms means that the therapist's music is not identical to the client's, but is the same in style and quality. Therefore the client experiences that the therapist's music 'fits together and matches' his or her own production (Wigram, 2004, p. 84)".

<sup>4</sup> 'He' is used throughout this appendix to refer either to the one boy or the four girls in this study, but the contents apply equally to both genders.

discover their voices and enjoy it, without the demands of speech and articulation but rather as a communicative channel. Such exploration also helped to build vocal skills and vocal confidence.

Undirected music experiences could include the same experiences as those directed by the therapist if the child initiated them.

Every undirected music part, as well as every directed music part, was always structurally opened and closed with the same greeting song and good-bye song, respectively.

### **A.1.2 Music experiences directed by therapist (10 minutes)**

*Music experience directed by therapist (DM)* is defined as a musical experience in which the music therapist and child engage in music activities predominately initiated, guided, structured and encouraged by the therapist.

Directed music experiences included exploring percussion instruments through the practice of different musical parameters (e.g., loud/soft, fast/slow), listening to recorded songs, and a vocally based rhythm game.

The rationale for each music experience which was directed by the therapist was written by relating to the age and pathology of the young children participating in this research, and was supported by many music therapy and child development practitioners describing these processes (Amir, 1999; Bitcon, 1976; Boxill, 1985; Gaston, 1968; Levin, Levin, & Safer, 1975; Orff, 1980; Robbins & Robbins, 1980; Sandbank, 1983; Sekeles, 1996; Stern, 1985/2000, 1995; Wigram & De Backer, 1999; Wood, 1974).

In this part of the session the therapist endeavored to facilitate the child in accomplishing a specific task. If the child did not achieve mastery of that task, the therapist presented a simple variation of it in later sessions. If the child refused to cooperate or showed no interest, the therapist allowed the child to choose what to do and she tried again, as soon as she could, to encourage the child to cooperate with her in engaging in the same activity or in a variation of it. What is of utmost importance with children of this age, following their implantation, is to heighten their sense of pleasure and motivation to cooperate in these new music experiences and to avoid a sense of frustration.

The following pre-determined activities, which were carried out by the researcher in the directed part of the music therapy sessions, are presented below.

#### **A.1.2.1 Opening/Closing song**

##### **Rationale**

Oldfield (in Wigram, Saperston, & West, 1995) writes: "I have found that children are reassured if the music therapy session starts off with the same tune every week. A greeting associated with a familiar tune can become an essential starting point for every session, providing familiarity and security" (Oldfield, 1995, p. 229). Playing an opening (greeting) and a closing (good-bye) song provides the child with a feeling of emotional security and stability by creating clear boundaries within the framework of a beginning and ending. Using very short and simple songs that are stable in their musical elements enables the child to experience structure and form. The opening song included only two words- name of the child and the word 'hello'. The closing song included three words: the child's name and the words 'goodbye' and 'see you'



(see Appendix N). Using a minimum number of words is appropriate to the developmental stage of these children following the implantation. When the child responds and joins in the singing by vocalizing or saying a syllable or a word, he becomes aware of his voice and gets practice in using it. More experiences with the voice will help the child develop different voice parameters such as dynamics, pitch, range, rhythmic sense, tempo, continuity, and accentuation, which are necessary for more effective communication. This process, with the repetition of the same song/s in every session, serves as a vehicle for the child to experience a sense of mastery of the material. This familiarity adds to the child's security in the new exposure to the world of sound. In addition, it provides the child with a shared positive experience with the therapist. It is a communicative experience, which is personally and socially gratifying.

The greeting song calls for attention and readiness from the child to participate in the session, while the closing one helps the child makes the transition from the session to his regular pre-school program.

### **Equipment**

The instrument of choice was an electronic keyboard since pianos were not available in the room assigned for this research study in the different settings. Because of their volume capabilities and pitch range, keyboard instruments in general, are aurally accessible to children with CI, such as those in this study.

### **Procedure**

At the beginning and end of every session, the therapist sings an opening/closing song that is short and simple (in terms of the musical elements and words) and accompanies herself with an electronic keyboard. The accompaniment consists of the melody without harmony due to the child's limited ability to perceive sounds. The songs may be repeated twice and the child may join in by exploring the keyboard or percussion or by vocalizing with the therapist. During ensuing sessions the child will be encouraged to sing along. After the songs have been repeated over a period of several sessions, the therapist may pause during the song so that the child can fill in a word, sound, or syllable that he has retained, according to his ability and motivation to do so.

#### **A.1.2.2 Playing vocally-based rhythm games**

##### **Rationale**

Vocality is considered to be a key factor in human communication. A vocally-based rhythm game uses rhythm chants that encourage development of language by practicing speech parameters such as rhythm, tempo, duration, accent, dynamics and pause. It involves time-ordered behavior and auditory sequencing skills. This game may promote vocalization because of the humorous and joyous atmosphere created while playing it and enables the child to have pleasurable interaction with the therapist. The child can also respond on different levels of interaction- initiate, imitate, take turns, synchronize, and terminate.

## Equipment

None.

## Procedure

The therapist recites a short rhythm chant. For example: “boom, boom, bam”. She repeats it several times, and then encourages the child to repeat it with the therapist or independently. During the next meetings, the ‘old’ chant is repeated and then a new one can be presented.

## Variations

1. The therapist can say only part of the chant and encourage the child to continue.
2. The chant can be accompanied with body movements or by softly beating a drum.
3. A longer chant can be presented, such as “boom, boom, bam, biri biri bam”.
4. During subsequent sessions the voice timbre, intonation and speed of the chant can be altered and the child’s reactions observed.

### A.1.2.3 Exploring percussion instruments

#### Rationale

Playing an instrument, even on the most basic exploratory level, develops sensory-motor skills such as planned movement, separation of movement, ear-eye-hand and hand-hand coordination, fine and gross motor skills, muscle tone and tactile sensitivity. It demands focused attention, time-ordered behavior and may improve rhythmic perception and performance. It promotes motor control and motor speed (as a function of kinesthetic memory, muscular control and rhythm).

Exposure to different sounds and musical elements that also exist in spoken language (see “Playing a vocally based rhythm game”) may improve auditory perception.

Playing with others develops self-organization, awareness of self and others, and impulse control. It stimulates and releases emotions (e.g., playing a cymbal and a drum may release aggression).

Receptive and expressive communication can be established effectively without having to draw on language skills. Playing an instrument can give the child an immediate sense of accomplishment and success. It enables the child to have a positive and creative experience on different levels of interaction such as imitating, turn-taking, coordinated joint attention, etc.

Guidelines for choosing the musical instruments were as follows:

1. To expose these children to musical instruments that produce a variety of sounds that motivate them to explore each instrument and choose *the instrument* they prefer and *the way* they would like to play it;
2. To provide musical instruments with a good sound quality;
3. To suit the instruments to the children’s developmental stage. Children gain control over whole-arm movements before they gain control over its parts.

Following are some examples of instruments that offer these young children easy sound production and the various motoric movements required to produce the sounds, e.g., beating the cymbal or the bongos with different mallets or hands, shaking the bells, playing on the electronic keyboard with their fingers, hands, or even their feet; playing the handle castanets by shaking them in the air or holding the handle in one hand and beating the castanets on the other palm; shaking the tambourine or beating it with a mallet while it is on the floor or other flat surface;

4. To purposely present some of the instruments in pairs, e.g., the castanets, the mallets, the tambourines, and the set of bongos (which consists of two drums that are attached to one another) to enable communicative interactions by using the same instrument (or playing the same instruments with the same type of mallets), and thus, not overwhelming these children with different instrumental timbres.

### **Equipment**

1. An electronic keyboard;
2. A cymbal (mounted on an adjustable floor stand);
3. One set of bongos;
4. Two headless tambourines;
5. Two handle castanets;
6. Two sets of sleigh bells on plastic handles;
7. Two pairs of mallets.

The reader may refer to section 3.5.1 for more details about the above mentioned equipment.

### **Procedure**

The therapist models a certain way of playing one of the percussions for the child, for example, using a mallet, she loudly beats one drum of the bongos once while saying the word 'loud' (or "boom") and then offers a mallet to the child. The child is encouraged to repeat the beating. If the child does not respond, the therapist repeats the original pattern. If the child cooperates, the therapist may loudly beat the drum twice and encourage the child again. Then, she beats a series of beats and waits to see the child's response. She can further elaborate on this game in the following ways:

1. Playing softly with the mallet while saying the word 'soft';
2. Playing with two mallets alternately;
3. Playing with both mallets simultaneously on both drums of the bongo set;
4. Playing with different mallets.

An additional game is to play ascending and descending glissandi on the keyboard of the electronic organ and to imitate the pattern by sometimes playing it on the organ and sometimes using the voice.

### **Variations**

1. The same activity as in (a) and (b) is implemented, using the other percussions instruments. Playing can be done in a conventional way or in a non-

conventional way such as playing loud/soft with the mallets or with different body parts on the electronic keyboard, playing on the stand of the cymbal or on the underside of the cymbal, and playing the tambourines by alternately putting them on the shoulders and moving them up and down.

2. The therapist can beat on two or three different percussions in a sequence and encourage the child to play the same way.
3. During subsequent sessions the same game can be played using different speeds and volumes.

#### **A.1.2.4 Listening to recorded songs**

##### **Rationale**

Recorded songs rather than live singing were chosen to enable another kind of listening experience for the child.

This activity was planned to stimulate vocalization and articulation by using songs that include one repeated syllable such as "la la la", or a very simple word consisting of two syllables, e.g. 'auto'. Such short and simple words or syllables are, again, as in the opening and closing songs, appropriate to the developmental stage of the children. While listening to the song, the child is exposed to different musical elements (as mentioned above) and can try to produce parts of it. This enables child and therapist to have a mutually enjoyable interaction and an aesthetic experience. The child can also experience a sense of mastery as a result of song repetition.

This experience involves auditory-visual integration through the presentation of sounds and pictures and promotes auditory memory and recall. In addition, the music of the specially recorded songs is different from the more complex music that the child might be exposed to in his everyday life and may evoke new responses from the child: The music of the songs is different from the more complex music that the child might be exposed to in his everyday life. Simple children's songs, commercially produced on tapes and CD's, usually include harmony and orchestral instruments or sound effects. The music proposed for this study is more basic in its elements, using only rhythm and melody. By limiting the music to its most basic aspects, the child who was previously deaf and subsequently received a cochlear implant is less likely to be overwhelmed by a myriad of acoustic signals. Thus, he/she may enjoy the music more. Schore (2003) states: "The attempt to regulate affect, to minimize unpleasant feelings and to maximize pleasant ones is the driving force in human motivation" (p. 16). As a result of enjoyment, the child may then be motivated to repeat the experience several times. As the elements of the simple music patterns more closely resemble the familiar parameters of speech, it may enhance better perception and mastery of the song as well as increased ability to imitate it.

Related to this issue is the fact that hearing in general and listening to music carries with it emotional messages. While being deaf, the child could not experience these messages. After the implantation, during music therapy, this experience of listening to songs broadens his/her emotional world.

Listening to a recorded song rather than a live one provides the researcher with an additional perspective on the child's hearing and responses.

Additional benefits have already been specified in the rationale for "opening/closing song" in this appendix.

## Equipment

1. A portable CD player with a good sound quality;
2. A CD with three recorded songs (see Appendix N). The researcher prepared the CD by singing the songs and providing a melodic line accompaniment on her piano at home. This type of accompaniment is easier for a young child with a CI to perceive than one that includes harmony;
3. A binder with three colored pictures (see Appendix O). Each song has a matching picture, which is the main subject of the song, e.g., a car, a dog. The pictures can serve as stimulation and motivation for the child to respond vocally.

## Procedure

The therapist demonstrates the game to the child by choosing a picture from the binder and plays the appropriate song. Example: the chosen picture is of a girl singing and the song consists of a short simple melody with the syllable 'la la la'. If the child shows interest, the song should be repeated several times and the child encouraged to sing along. If the child asks to stop, the music therapist then suggests that he choose another picture. The therapist plays the matching song and the above process is repeated.

## Variations

1. During subsequent sessions, after the child has already heard the songs several times, the music therapist can try the opposite procedure: Play one of the songs to the child, and ask if he can find the picture in the binder that matches the song.
2. The therapist tricks the child by choosing a song, playing it and pointing to the wrong picture. If the child does not detect the trick, the therapist corrects herself and points to the right picture. She never makes the child feel a sense of failure if there is a difficulty and always encourages and helps the child in a warm, humorous manner.
3. The child chooses a song from the CD and the therapist 'tries' to find the right picture. Then, the therapist tricks the child by choosing the wrong picture. The child's responses are observed and the therapist responds as in the second variation.

## A.2 Play sessions protocol

Play is considered to be an enjoyable and pleasurable process that is crucial for a child's development. It is the child's natural medium for self-expression and growth. There is an abundance of literature written on play, some of which was presented in section 2.2.8 and served as a basis for this section. Play was chosen as the control condition in this study, due to its relevance to the young age of the children. Play was an integral part of their daily life before the implantation and it still is, in contrast to music therapy, which is a whole new experience for them; therefore, the rationale for each play activity was not detailed here. Briefly, the play activities included emotional, cognitive and motoric aspects of play.

In order to clearly differentiate between the music therapy intervention and the play sessions, and to avoid contamination of the results, no sound-making or musical games or toys were included in the play sessions.

### **A.2.1 Play not directed by therapist (10 minutes)**

*Play not directed by therapist* (UP) is defined (see section 3.7) as play activities in which music therapist and child spontaneously play with games and toys that are predominately initiated and structured by the child. As in music therapy, in this part of the session, the therapist responds to child-led activities, using imitation, turn-taking and matching<sup>5</sup> to support the child's initiatives. The child may spontaneously build a structure, or begin to organize the activity when seeing the therapist's preparedness to respond to his/her ideas or initiatives. As in music therapy, giving meaning to an experience initiated by the child acknowledges his ideas, which may add to his positive self-image and provides him with an opportunity to exert control, which is so important to these children.

Play activities which were not directed by the therapist included playing with the same toys and games as in the play directed by the therapist, such as "Duplo" blocks and dolls, kitchen dishes and foods, a doll which consists of three dolls in one ("little red riding hood") and an in-set puzzle. As with every undirected and directed music part, the two parts of the play session were also structurally opened and closed by the following procedures: The therapist opened the session with a warm, verbal greeting, by calling the child's name and inviting him to the area in the room where the session took place. The session was closed with a goodbye 'ritual' by telling the child that it is time to finish playing and separate with two words: 'goodbye' and 'see you.'

Occasionally, some children vocalized during the sessions. The therapist responded in the same way as she did in the music therapy sessions, by further developing the children's initiated free vocalizations through exploration of high/low tones, laughing, and vocal glissandi for the same reasons described in section A.1.1.

As with music therapy, undirected play experiences could include the same experiences as those directed by the therapist if the child initiated them.

### **A.2.2 Play directed by therapist (10 minutes)**

*Play directed by therapist* (DP) is defined as play activities, in which music therapist and child engage in games or playing with toys, predominately initiated, guided, structured and encouraged by the therapist.

Directed play experiences included exploring different toys and games by practicing motoric and cognitive functions such as building with Duplo blocks, preparing a meal, feeding a doll with a 'bottle' of milk, playing with an inset puzzle, etc. As with music therapy, undirected play experiences could include the same experiences as mentioned above (in the directed part of the play session) if the child initiated those experiences.

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<sup>5</sup> Matching (in play): Playing in a way that is compatible, matches or fits in with the client's style of playing, while maintaining the same dynamics, quality and complexity, presented by the client in his play. To achieve a 'match' in keeping with the above definition of musical terms means that the therapist's play is not identical to the client's, but is the same in style and quality. Therefore the client experiences that the therapist's play response 'fits together and matches' his or her own playing style (PhD course, Aalborg University, November 2006).

The toys and games for the play activities which were directed by the therapist (and were used by the child in the undirected session part as well), were carefully chosen as developmentally appropriate for this age group (two to three years of age) after consultation with the kindergarten teachers who worked with the children and also taking into consideration suggestions in the following references: Casey, 2005; Hughes, 1991; Riddick, 1982.

As in music therapy, in this part of the session the therapist endeavored to facilitate the child in accomplishing a specific task. If the child did not achieve mastery of that task, the therapist presented a simple variation of it in later sessions. If the child refused to cooperate or showed no interest, the therapist allowed the child to choose what to do and she tried again, as soon as she could, to encourage the child to cooperate with her in engaging in the same activity or in a variation of it. What is of utmost importance with children of this age, following their implantation, is to heighten their sense of pleasure and motivation to cooperate in these play experiences and to avoid a sense of frustration, as Riddick (1982) writes: "Play is engendered and fostered by inventiveness, enjoyment and surprise" (p. 9).

The following pre-determined activities, which were carried out by the researcher in the directed part of the play sessions, are presented below. These activities could, of course be employed in the undirected part of the sessions if the child initiates them.

#### **A.2.2.1 Inset puzzle**

##### **Equipment**

1. A wooden in-set puzzle, which includes five human figures and four cars;
2. "Duplo" dolls: a baby, a girl, a boy, a man, a woman.

##### **Procedure**

The wooden pieces of the puzzle are scattered on the floor. First, the researcher matches every shaped piece to its place in the puzzle, so that the child can observe the process. Then the researcher turns the completed puzzle over so that once more, the pieces are scattered, and she suggests that the child start to put the puzzle together again. If he does it correctly, the researcher praises him. When the child puts a piece in the wrong place, the therapist can ask: "Here?" so that the child can check one more time whether it fits or not. If he does not succeed, the therapist helps him.

##### **Variations**

1. The researcher tricks the child and puts one piece (or more) of the puzzle in the wrong place. If the child detects the trick, the researcher praises the child, removes the piece from the wrong place and gives the piece to the child to look for the right place to insert it. If the child does not detect the trick, the therapist corrects herself and puts the piece in the right place. She never makes the child feel a sense of failure if a difficulty arises, but rather encourages and helps the child in a warm, humorous manner.
2. The researcher inserts one of the plastic Duplo dolls into the puzzle instead of the right piece (one of the five human figures). If the child detects the trick, the researcher removes the Duplo doll and asks the child "where?" to indicate

to the child to search for the original wooden figure of the inset puzzle that he should locate and put in the right place.

#### **A.2.2.2 Playing with a doll**

##### **Equipment**

1. A doll which consists of three dolls in one: “Little red riding hood”, the wolf, and the grandmother;
2. A small plastic bottle with ‘milk’ that disappears when it is turned upside down and re-appears when it is turned the other way around, as if the bottle is filled up with milk again;
3. Two small furry blankets;
4. A small pillow.

##### **Procedure**

The researcher first introduces this sophisticated doll to the child, and requested him/her to try and change from one doll to the other. She offers help if needed. Then, she may make one of these dolls, for example, the “little red riding hood”, drink some milk (or eat food). She shows the child how the ‘milk’ disappears when she turns the bottle upside down and reappears when she turns it upright again. She then offers the doll and the bottle of milk to the child to try it out.

Later, the researcher may put the doll to sleep on the small pillow, and cover the doll with the furry blanket.

##### **Variation**

The same type of play but with the three-in-one doll as the wolf, or the grandmother and with different kinds of food.

#### **A.2.2.3 Preparing a meal**

##### **Equipment**

1. Plastic kitchen dishes (a plate, a pot with a lid, a cup, a fork, a spoon and a knife);
2. Plastic food (a cookie, a croissant, a bun, and some fruits: a peach, a pear, a lemon, a banana);
3. A small plastic bottle with ‘milk’ (The same bottle as used in the previous activity).

##### **Procedure**

The researcher prepares a meal by putting a plate, a cup, a fork, a knife and a spoon on the rug. She pretends to cut the plastic fruits, the bun or the croissant and puts some food on the plate and eats and/or drinks. She offers the child some food by asking what he would like to eat. She may also pretend that she uses the pot for cooking by putting some food in it and stirring it with the spoon.



**Variation**

The researcher suggests feeding the special doll (three-in-one doll) or the Duplo dolls after preparing a meal.

**A.2.2.4 Playing with Duplo blocks****Equipment**

A plastic bucket with “Duplo” blocks and dolls (two ‘windows’, a baby, a girl, a boy, a man, a woman, a dog, two mini-carts)

**Procedure**

The following procedures can follow either one after the other, or in a different order or in different sessions, depending on the child’s interest and motivation.

1. Combining two mini-carts together and moving them around with dolls or other Duplo blocks built on them.
2. The therapist models peek-a-boo type of game by looking at the child through the Duplo ‘window’ and saying ‘cuckoo’. Then, she can hold either the Duplo dog or another Duplo doll up to the open window and repeat 'cuckoo'!.
3. Putting the Duplo dolls to sleep or feeding them. Building a house from a few Duplo blocks and knocking it down.

## **Appendix B**

### **Parent information sheet**

Dear Mr. and Mrs. \_\_\_\_\_,

I will be doing a research project as part of the requirements of my PhD studies in music therapy. The title of this research is: "The effect of music therapy on spontaneous communicative interactions of young children with cochlear implants".

You are invited to read this information sheet in order to consider your child's and your participation.

#### **Purpose**

The purpose of this research is to investigate whether musical experiences enhance spontaneous communicative interactions (imitation, initiation, turn-taking, and synchronization) of young children following cochlear implantation. These behaviors are important for developing normal communication. Music is like a language, and can encourage and increase communicative activity.

#### **Previous research and possible benefits**

The literature reports on increased communicative responses demonstrated in music therapy in other populations. For children with CI, music, as a communicative media, can serve as a bridge between the world of silence and that of sounds in their transition to the hearing world. In a playful communicative experience such as music therapy, these children can experience controlled exposure to the world of sounds by exploring musical elements such as rhythm, pitch, loudness, timbre, etc., which are language components as well. In addition, until they learn to speak, they can use music, which is a non-verbal form of language, as a channel through which they can express emotions, and discover their voices. Practicing new sounds and syllables with their voices will help them to develop verbal language, and cope with articulation, syntax, vocabulary, grammar, etc. The literature in this area also reports the special value music and music therapy has for children with CI. This literature is primarily in the form of clinical reports. As yet, hardly any formal research has been carried out.

My master's dissertation focused on children who are deaf. The title was: "Auditory training through music as a therapeutic tool for hearing impaired preschool

children.” In previous research with music therapy and children who are deaf, there were no risks whatsoever. The same holds true for the clinical reports on music therapy and children with CI.

### **Method of research**

During the research period, I will give your child eight sessions of play and eight sessions of music therapy. My intention is to determine whether music therapy enhances specific spontaneous communicative behaviors of your child when compared to play. Discussion of the results will provide a basis to consider whether music therapy, as implemented in this research, may become an additional and integral part of a habilitation program for these young children, as well as expanding research and clinical material in this area. Each session will be conducted once a week in the educational setting for children with hearing impairments, where your child is treated. The session will last 20 minutes. During the play sessions I will use a variety of toys and games, appropriate for the child's age. In music therapy we will play simple musical instruments, song games, rhythm games, etc. All sessions will be videotaped and analyzed by me and by other professionals who will view the videotapes only for this purpose. All personal data regarding your child and family will be strictly confidential and will **not** be available to professionals. The analysis will include measurements of frequencies and duration of children's communicative interactions, i.e., counting how many times each of the above mentioned behaviors appears and how long some of them last.

### **How you can help**

As parents, you are by far the best-informed and knowledgeable people about your child, and I would like to invite you to participate in this research by:

1. Completing a questionnaire regarding your child's sensory experiences (e.g. my child resists being cuddled, only eats certain foods). Your answers are important for the inclusion of your child in this study and may be relevant to the interpretation of the results of this study;
2. Attending all 16 sessions if possible;
3. Completing a questionnaire regarding your child's involvement with music since he or she was implanted (before the commencement of this study) and after the study ends;

4. Viewing short segments of the music therapy sessions, and then reflecting on what you saw and felt in relation to your child's participation in music therapy.

**University supported study and ethics**

My supervisor for this research is Prof. Tony Wigram from the University of Aalborg in Denmark, where I officially study. He is a leading figure in music therapy and an expert in the area of communication.

This study will be carried out according to the ethical rules in research involving humans (1999). It has been approved by the Helsinki Committee (project no. 04-158), Tel Aviv Sourasky Medical Center, affiliated with the Tel Aviv University, Sackler Faculty of Medicine, Israel.

You are free to withdraw your child and yourself from the study at any time. Pseudonyms will be used throughout. At no time will your child's name or your name ever be used in any verbal or written report regarding this study, unless you specifically agree that your child's name may be used.

If you would like to get more information or if you have any questions, please contact me on the numbers: 04-6396382 or 050-2100014.

I hope you understand the possible benefits of this study for your child as well as for the music therapy profession and that you agree to participate and have your child participate as well, by signing the attached consent form. After signing it you will receive a copy of this information sheet as well as the consent form.

I am looking forward to working with your child and you.

Thank you,

Sincerely,

Dikla Kerem  
Music therapist



## Appendix C

### Parent consent form

Completed by father/mother (Please circle)

I \_\_\_\_\_ have read the "Parent information  
(Please print full name)

sheet" and agree to participate and permit my child \_\_\_\_\_  
(Please print child's name)

to participate in the research study titled: "The effect of music therapy on spontaneous communicative interactions of young children with cochlear implants" being conducted by Dikla Kerem, Registered Music Therapist.

- I understand that the research study will be carried out according to the ethical rules in research involving humans.
- I understand the purpose of this research study, the procedures, the demands and the possible benefits as well as any inconveniences that may arise as outlined in the information sheet that has been given to me.
- I understand that I am free to withdraw my consent or my child at any time.
- I understand that I may request more information and/or ask questions in relation to the research study.
- I understand that pseudonyms will be used throughout and at no time will my child's name or my name ever be used in any verbal or written report regarding this study, unless I specifically agree that my child's name may be used. I also understand that any data regarding my family will be kept strictly confidential by the researcher.
- I authorize videotapes to be taken of my child and I permit these videotapes to be used in publications directly related to this research, or used for the purpose of education, knowledge or research<sup>1</sup>.

---

<sup>1</sup> If you are concerned about future use of video material for publication, research or education, please see attached video consent form, and indicate the extent to which you are prepared for video material to be used.

**Parent:**

Signed \_\_\_\_\_  
Parent signature Date

**Researcher:**

I \_\_\_\_\_ have fully explained the purposes, procedures and demands of the above named study to the person named herein.

Signed \_\_\_\_\_  
Researcher signature Date

## Video consent form

Name of Family \_\_\_\_\_

Date \_\_\_\_\_

Video recordings of all the sessions (trials) are going to be made in order to make a detailed analysis of children's responses to both music therapy and play.

We would like your permission to video your child's sessions, and to make use of the recording for further observation, and occasional teaching and lecturing to health and education professionals and students.

**CONFIDENTIALITY IS MAINTAINED AT ALL TIMES, AND NO REFERENCE IS MADE TO PERSONAL DETAILS REGARDING YOUR FAMILY, AND YOUR NAMES ARE OF COURSE CONFIDENTIAL.**

Signature \_\_\_\_\_

1. I approve of video recordings being made of my child for records and for analyzing data for this research, providing confidentiality is maintained.

YES / NO

2. I approve of the video recording of my child being used for teaching and lecturing purposes, providing confidentiality is maintained.

YES / NO

3. I approve of the video recording of my child being referred to for use in research publications.

YES / NO

Thank you,  
Sincerely,

Dikla Kerem





## Appendix D

### Parent interview consent form

Completed by father/mother (Please circle)

I \_\_\_\_\_ have read the "Parent information sheet"  
 (Please print full name)  
 and agree to be interviewed in this research study titled: "The effect of music therapy on spontaneous communicative interactions of young children with cochlear implantation" being conducted by Dikla Kerem, Registered Music Therapist.

- I hereby agree that the interview may include personal questions regarding my child and myself.
- I hereby agree that the interview will be recorded on a tape recorder.
- I understand that any data regarding my family will be kept strictly confidential by the researcher.
- I hereby agree that the transcribed interview can be used in publications directly related to this research, or used for the purpose of education, knowledge, or research.

**Parent:**

Signed \_\_\_\_\_  
Parent signatureDate

**Researcher:**

I \_\_\_\_\_ have fully explained the purpose and procedures related to the interview to the person named herein.

Signed \_\_\_\_\_  
Researcher signatureDate



## Appendix E

## Session data collecting form

**Child's name:**..... **Session #**..... **Date:**.....

**Music therapy** ☐      **Play** ☐      **Directed** ☐      **Undirected** ☐

[illegible]

<sup>a</sup>**Behavior codes:** 1= initiation; 2= imitation; 3= synchronization; 4= turn-taking.  
**Note.** All communicative interactions are **spontaneously** demonstrated by the child.



## Appendix F

### Infant/Toddler Sensory Profile

#### Clinical Edition Caregiver Questionnaire

Winnie Dunn, PhD, OTR, FAOTA  
with  
Debora B. Daniels, MA, CCC-SLP

Child's name: \_\_\_\_\_ Birth Date: \_\_\_\_\_ Date: \_\_\_\_\_

Completed by: \_\_\_\_\_ Relationship to Child: \_\_\_\_\_

Service Provider's Name: \_\_\_\_\_ Discipline: \_\_\_\_\_

#### Instructions

Please check the box that best describes the frequency with which your child does the following behaviors. If your child is birth to 6 months of age, please answer only the statements that are shaded. If your child is 7-36 months of age, please answer all of the statements. If you are unable to comment because you have not observed the behavior or believe it does not apply to your child, please draw an X through the number for that item. Write any comments at the end of each section. Please do not write in the Section Raw Score Total row.

#### Use the following key to mark your responses:

**Always:** When presented with the opportunity, your infant/toddler **always** responds in this manner, 100% of the time.

**Frequently:** When presented with the opportunity, your infant/toddler **frequently** responds in this manner, about 75% of the time.

**Occasionally:** When presented with the opportunity, your infant/toddler **occasionally** responds in this manner, about 50% of the time.

**Seldom:** When presented with the opportunity, your infant/toddler **seldom** responds in this manner, about 25% of the time.

**Never:** When presented with the opportunity, your infant/toddler **never** responds in this manner, 0% of the time.

Item	A. General Processing	Always	Frequently	Occasionally	Seldom	Never
1	My child's behavior deteriorates when the schedule changes.					
2	My child has difficulty getting to sleep and is easily awakened.					
3	My child is irritable when compared to same age children.					
4	My child is unaware of people coming in and going out of the room.					
Section Raw Score Total						

**Comments:**

.....

Item	B. Auditory Processing (Not included in this study!)	Always	Frequently	Occasionally	Seldom	Never
5	My child ignores me when I am talking.					
6	My child is distracted and/or has difficulty in noisy environments.					
7	My child seems unaware of continuous noise in the environment (for example, TV, stereo).					
8	My child enjoys making sounds with his/her mouth.					
9	My child takes a long time to respond, even to familiar voices.					
10	I have to speak loudly to get my child's attention.					
Section Raw Score Total						
11	My child refuses to play with musical toys.					
12	My child finds ways to make noise with toys.					
13	My child prefers to play with noisy toys.					
14	It takes a long time for my child to respond to his/her name when it is called.					
Section Raw Score Total						

**Comments:**

.....

Item	C. Visual Processing	Always	Frequently	Occasionally	Seldom	Never
15	My child startles at own reflection in the mirror.					
16	My child avoids looking at toys.					
17	My child avoids eye contact with me.					
18	My child enjoys looking at moving or spinning objects (for example, ceiling fans, toys with wheels, floor fans).					
19	My child enjoys looking at shiny objects.					
20	My child reacts to all faces the same way (for example, to strangers, parents, caregivers, grandparents, siblings).					
Section Raw Score Total						
21	My child is distracted by busy picture books.					
22	My child refuses to look at books with me.					
23	My child enjoys looking at own reflection in the mirror.					
Section Raw Score Total						

**Comments:**

.....





Item	E. Vestibular Processing	Always	Frequently	Occasionally	Seldom	Never
38	My child becomes upset when placed on back to change diapers.					
39	Riding in the car upsets my child.					
40	My child resists having head tipped back during bathing.					
41	My child cries or fusses whenever I try to move him/her					
42	My child requires more support for sitting than other children the same age (for example, infant seat, pillows, towel roll).					
43	My child enjoys physical activity (for example, bouncing, being held up in the air).					
44	My child enjoys rhythmical activities (for example, swinging, rocking, car rides).					
45	My child doesn't seem to notice position changes and can be moved about with ease.					
<b>Section Raw Score Total</b>						
46	My child refuses to participate in roughhousing.					
47	It takes a lot of roughhousing for my child to react.					
<b>Section Raw Score Total</b>						

**Comments:**

.....

Item	F. Oral Sensory Processing	Always	Frequently	Occasionally	Seldom	Never
48	My child notices slight changes in the food.					
49	My child refuses all but a few food choices.					
50	My child resists having teeth brushed.					
51	My child refuses to try new foods.					
52	My child licks/chews no nonfood objects.					
53	My child mouths objects.					
54	My child is unaware of food or liquid left on lips.					
55	My child seems to enjoy bitter, sour, and/or spicy foods more than most children of the same age.					
56	My child likes to smell nonfood objects.					
57	My child likes to smell foods.					
58	My child chooses foods with strong flavors (for example, lemon, pepper, curry, cumin).					
Section Raw Score Total						

**Comments:**

.....

## Summary

**Instructions:** Transfer the score for each section to the Section Raw Score Total column. Plot these totals by marking an X in the appropriate classification column (Typical Performance, Performance at Risk).\*

**Score key**  
 1 = Always  
 2 = Frequently  
 3 = Occasionally  
 4 = Seldom  
 5 = Never

Cut Scores for Children Ages Birth to 3 Month (Shaded Items)	Section Raw Score Total	Typical Performance	Performance at Risk
A. General Processing	/20	20-----10	9-----4
B. Auditory Processing	/30	30-----17	16-----6
C. Visual Processing	/30	30-----12	11-----6
D. Tactile Processing	/25	25-----17	16-----5
E. Vestibular Processing	/40	40-----25	20-----8

\* Classifications are based on the performance of children without disabilities ( $n = 36$ ). It should be noted that the sample was not representative of the general population and should be used with caution.

Cut Scores for Children Ages 4 to 6 Month (Shaded Items)	Section Raw Score Total	Typical Performance	Performance at Risk
A. General Processing	/20	20-----13	12-----4
B. Auditory Processing	/30	30-----16	15-----6
C. Visual Processing	/30	30-----18	17-----6
D. Tactile Processing	/25	25-----18	17-----5
E. Vestibular Processing	/40	40-----24	23-----8

\* Classifications are based on the performance of children without disabilities ( $n = 38$ ). It should be noted that the sample was not representative of the general population and should be used with caution.

Cut Scores for Children Ages 7 to 12 Month (All Items)	Section Raw Score Total	Typical Performance	Performance at Risk
A. General Processing	/20	20-----13	12-----4
B. Auditory Processing	/50	50-----29	28-----10
C. Visual Processing	/45	45-----28	27-----9
D. Tactile Processing	/70	70-----38	37-----14
E. Vestibular Processing	/50	50-----30	29-----10
F. Oral Sensory Processing	/55	55-----18	17-----11

\* Classifications are based on the performance of children without disabilities ( $n = 67$ ). It should be noted that the sample was not representative of the general population and should be used with caution.

<b>Cut Scores for Children Ages 13 to 36 Month (All Items)</b>	<b>Section Raw Score Total</b>	<b>Typical Performance</b>	<b>Performance at Risk</b>
A. General Processing	/20	20-----13	12-----4
B. Auditory Processing	/50	50-----32	31-----10
C. Visual Processing	/45	45-----31	30-----9
D. Tactile Processing	/70	70-----43	42-----14
E. Vestibular Processing	/50	50-----33	32-----10
F. Oral Sensory Processing	/55	55-----33	32-----11

\* Classifications are based on the performance of children without disabilities ( $n = 260$ ). It should be noted that the sample was not representative of the general population and should be used with caution.

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**Appendix G**  
**Infant/Toddler Sensory Profile-Clinical Edition: Cut scores**  
**(Dunn, 1997, 1999)<sup>1</sup>**

<b>Cut scores for children ages 13 to 36 months</b>	<b>Typical performance</b>	<b>Performance at risk</b>
A. General processing	20-----13	12-----4
B. Visual processing	45-----31	30-----9
C. Tactile processing	70-----43	42-----14
D. Vestibular processing	50-----33	32-----10
E. Oral sensory processing	55-----33	32-----11

	<b>Child's name</b>				
	<b>C</b>	<b>Ay</b>	<b>Z</b>	<b>Af</b>	<b>O</b>
<b>Processing section</b>	<b>Section raw score total</b>				
A. General processing	17	18	13	13	17
B. Visual processing	36	37	31	36	31
C. Tactile processing	54	56	44	55	60
D. Vestibular processing	34	33	36	40	40
E. Oral sensory processing	48	49	33	52	53

<sup>1</sup> The section of auditory processing was taken out of the original profile.



## Appendix H

### Parent questionnaire- First version<sup>1</sup>

Date: \_\_\_\_\_

Child's first name: \_\_\_\_\_ Last name: \_\_\_\_\_

Child's date of birth: \_\_\_\_\_ Phone: \_\_\_\_\_ Mobile phone: \_\_\_\_\_

Father's country of origin: \_\_\_\_\_

Mother's country of origin: \_\_\_\_\_

1. How does your child respond to music (sings, dances, ignores, protests against specific music, etc)? : \_\_\_\_\_

2. Do you have any musical instruments at home? \_\_\_\_\_

If you do, what kind of instrument(s)? \_\_\_\_\_

\_\_\_\_\_

Does any family member at home play this/these instrument/s? \_\_\_\_\_

If the answer is positive, how does the child spontaneously respond to the playing?

\_\_\_\_\_

3. Do you sometimes sing to your child? \_\_\_\_\_

If you do, can you give some examples of these songs? \_\_\_\_\_

\_\_\_\_\_

4. Please describe the music experiences of the other family members at home:

- Listening to music on the radio (which kind of music?): \_\_\_\_\_

- Listening to TV (e.g., MTV, classical music, specific children's programs, etc.): \_\_\_\_\_

- Listening to CD's/tapes (what kind of music, primarily?): \_\_\_\_\_

Out of the above-mentioned music, does the child prefer any specific music?

\_\_\_\_\_

Does he/she prefer other music: What kind? \_\_\_\_\_

\_\_\_\_\_

5. Is the child involved in music experiences at home? \_\_\_\_\_

If he/she does, please describe: \_\_\_\_\_

\_\_\_\_\_

<sup>1</sup> Note: This was the first version of the questionnaires before they were revised and refined.



6. Does the child listen to CD's/tapes of his/her own? \_\_\_\_\_  
If he/she does, to what kind of music? \_\_\_\_\_

When (What time of the day)? \_\_\_\_\_  
How often (How many times a day?) \_\_\_\_\_

7. Is there another member of the family besides parents (such as sister or brother, grandmother grandfather, etc) who provides the child with additional music experience? \_\_\_\_\_

If the answer is positive, who is that person (or persons)? \_\_\_\_\_  
What kind of experience(s)? \_\_\_\_\_

8. If you have any further comments, which you think might add additional information, please detail: \_\_\_\_\_

Thank you for your cooperation,  
Sincerely,

Dikla Kerem

## Appendix I

### Appendix I1: Parent pre-intervention questionnaire

Completed by father/mother (Please circle)

Date: \_\_\_\_\_

First name of your child: \_\_\_\_\_ Last name: \_\_\_\_\_

Child's date of birth: \_\_\_\_\_ Phone no.: \_\_\_\_\_ Mobile phone: \_\_\_\_\_

Date of cochlear implantation: \_\_\_\_\_ Type of CI: \_\_\_\_\_

This questionnaire will be completed separately by you and your spouse.

The purpose of this questionnaire is to become more familiar with how each parent relates to and perceives the child's involvement with music since the child was implanted.

Please note that all the questions relate to the period SINCE your child has been implanted!

According to the question, please circle the letter and/or word on the scale (i.e., Most of the time, frequently, etc.), which most closely represents what you think. In addition, please add any comments or explanations if needed.

In some questions, the word 'spontaneously' appears. The reason for this is that I am interested in how your child responds without anybody cueing or trying to encourage her/him to respond.

Please answer this questionnaire as candidly as you can. If there are consistent times when music is not pleasant for your child, or a consistently bad response to certain types of music, I would like to know that.

When required, use the following key to mark your responses:

**Almost always:** When presented with the opportunity, your child responds in this manner about 90% of the time.

**Frequently:** When presented with the opportunity, your child responds in this manner about 75% of the time.

**Occasionally:** When presented with the opportunity, your child responds in this manner about 50% of the time.

**Seldom:** When presented with the opportunity, your child responds in this manner about 25% of the time.

**Never:** When presented with the opportunity, your child responds in this manner 0% of the time.

**When answering a question of this type, please pay attention that you circle *only one* of the above mentioned keys as your answer.**

1. How does your child spontaneously respond to music, which is heard at home via tape recorder, radio, or CD player (**not** including TV or videos)?

Note: The music must be at a volume above the child's threshold of hearing.

(a) Indicates somehow that he is listening by-

(i) Signing with her/his hand  
Never Seldom Occasionally Frequently Almost always

(ii) Smiling  
Never Seldom Occasionally Frequently Almost always

(iii) Looking towards the source of the music in an attentive way  
Never Seldom Occasionally Frequently Almost always

(b) Tries to vocalize (i.e., not singing, just making sounds with the voice)  
Never Seldom Occasionally Frequently Almost always

(c) Shows a motoric response such as swaying, jumping, dance movements, etc.  
Never Seldom Occasionally Frequently Almost always

(d) Claps hands  
Never Seldom Occasionally Frequently Almost always

(e) Ignores the music  
Never Seldom Occasionally Frequently Almost always

(f) Always protests and asks to stop any music  
Never Seldom Occasionally Frequently Almost always

(g) Protests and asks to stop specific music  
Never Seldom Occasionally Frequently Almost always

(h) Tries to sing (i.e., to produce a melody, not only sounds)  
Never Seldom Occasionally Frequently Most of the time

(i) Other responses. Explanation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Do you have any musical instrument at home? (a) Yes (b) No

If 'Yes', what kind of instrument(s)? \_\_\_\_\_

Does any family member at home play this (or these) instrument(s)?

(a) Yes (b) No

If 'Yes', how does the child spontaneously respond to the playing?

(a) Signs somehow that he is listening by-

(i) Signing with her/his hand  
Never Seldom Occasionally Frequently Almost always

(ii) Smiling  
Never Seldom Occasionally Frequently Almost always

(iii) Looking towards the source of the music in an attentive way  
 Never Seldom Occasionally Frequently Almost always

(b) Tries to vocalize (i.e., not singing, just making sounds with the voice)  
 Never Seldom Occasionally Frequently Almost always

(c) Shows a motoric response such as swaying, jumping, dance movements etc.  
 Never Seldom Occasionally Frequently Almost always

(d) Claps hands  
 Never Seldom Occasionally Frequently Almost always

(e) Ignores the music  
 Never Seldom Occasionally Frequently Almost always

(f) Always protests and asks to stop any music  
 Never Seldom Occasionally Frequently Almost always

(g) Protests and asks to stop specific music  
 Never Seldom Occasionally Frequently Almost always

(h) Tries to sing (i.e., to produce a melody, not only sounds with the voice)  
 Never Seldom Occasionally Frequently Most of the time

(i) Other responses. Explanation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Does the child try to produce sounds with this (these) instrument(s)?  
 Never Seldom Occasionally Frequently Almost always  
 If s/he does, please describe: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**3. Are there certain musical sounds or styles of music that your child likes to listen to?**

(a) Yes (b) No

If 'Yes', what are her/his preferences? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Does s/he ask to listen to it by

(a) Bringing a CD/tape to you? (i) Yes (ii) No

(b) Turning on the radio/tape/CD player? (i) Yes (ii) No

(c) Other responses. Explanation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**4. Are there certain musical sounds or music that your child seems to dislike? (a) Yes (b) No**

If 'Yes', what sounds or music? \_\_\_\_\_  
 How does s/he show her/his dislike? \_\_\_\_\_  
 \_\_\_\_\_

5.\* Are there particular types of music activities or types of listening situations that enhance musical enjoyment for your child? For example, a quiet listening environment, good quality sound equipment, live vs. recorded music, type of music or instrument, volume of music, etc. (a) Yes (b) No

If 'Yes' please explain: \_\_\_\_\_  
 \_\_\_\_\_

6.\* Are there particular types of music activities or types of listening situations that make music less enjoyable for your child? For example, competing noise, poor quality sound equipment, live vs. recorded music, type of music or instrument, etc. (a) Yes (b) No

If 'Yes', please explain: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

7. Do you sometimes sing to your child since the implantation?

(a) Yes (b) No

If you do, can you give some examples of these songs? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

How does the child spontaneously respond to your singing?

(a) Indicates somehow that he is listening by-

(i) Signing with her/his hand

Never   Seldom   Occasionally   Frequently   Almost always

(ii) Smiling

Never   Seldom   Occasionally   Frequently   Almost always

(iii) Watching your face in an attentive way

Never   Seldom   Occasionally   Frequently   Almost always

(b) Tries to vocalize

Never   Seldom   Occasionally   Frequently   Almost always

(c) Shows a motoric response such as swaying, jumping, dance movements, etc.

Never   Seldom   Occasionally   Frequently   Almost always

(d) Claps hands

Never   Seldom   Occasionally   Frequently   Most of the time

---

\* This question was copied from Gfeller et al (1999), Appendix 1.

(e) Ignores your singing

Never Seldom Occasionally Frequently Almost always

(f) Always protests and asks to stop any singing

Never Seldom Occasionally Frequently Almost always

(g) Protests and asks to stop singing a specific song (or songs)

Never Seldom Occasionally Frequently Almost always

(h) Tries to sing (i.e., to produce a melody, not only sounds)

Never Seldom Occasionally Frequently Most of the time

(i) Other responses. Explanation: \_\_\_\_\_

\_\_\_\_\_

**8.** Have you tried to offer the child a cassette tape or a CD with music to listen to?

Never Seldom Occasionally Frequently Almost always

If you have, what tape(s) and/or CD ('s)? \_\_\_\_\_

\_\_\_\_\_

How has the child responded to your offer? \_\_\_\_\_

\_\_\_\_\_

**9.** Is your child's use of sound games and toys different from how s/he played with them prior to the implantation? (a) Yes (b) No (c) I have not paid attention to that

If 'Yes', could you please describe it: \_\_\_\_\_

\_\_\_\_\_

Does s/he currently enjoy playing with the sound games and toys for the purpose of producing sounds?

(i) Never Seldom Occasionally Frequently Almost always

(ii) It is not clear enough whether s/he plays with it in order to produce sounds.

If your answer is positive, please explain (what toys/games, when, etc.):

\_\_\_\_\_

\_\_\_\_\_

**10.** Have you ever tried to offer your child headphones to wear for listening to music?

Never Seldom Occasionally Frequently Almost always

If you have, can you describe the child's reaction? \_\_\_\_\_

\_\_\_\_\_

What type of headphones did you use?

\_\_\_\_\_

**11.** Is there another member of the family besides parents (such as sister or brother, grandmother, grandfather, etc) who provides the child with additional musical experience (including singing)?

(a) Yes (b) No

If 'Yes', who is that person (or persons)? \_\_\_\_\_

What kind of experience(s)? \_\_\_\_\_

\_\_\_\_\_

How does the child respond to that? \_\_\_\_\_

\_\_\_\_\_

**12.** If you have any further comments, which you think might shed additional light on your child's musical behavior, please add them: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**13.** In the light of the explanations you received before you signed the consent form, what expectations do you have from this research? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank you very much for completing this questionnaire,

Sincerely,

Dikla Kerem

## נספח I

### נספח I2: שאלון להורה לפני ההתערבות

ממלא/ת השאלון: אם / אב (סמן בעיגול)

תאריך מלוי השאלון: \_\_\_\_\_

שם פרטי של הילד: \_\_\_\_\_ שם משפחה: \_\_\_\_\_ תאריך לידה: \_\_\_\_\_  
טל. בבית: \_\_\_\_\_ טל. נייד: \_\_\_\_\_ תאריך ההשתלה: \_\_\_\_\_  
סוג השתל: \_\_\_\_\_

שאלון זה ימולא **בנפרד** על-ידיך ועל-ידי בן/בת זוגך.  
כדי למנוע סרבול, נכתב השאלון בלשון זכר, אך הינו מיועד לשני המינים.

מטרת השאלון היא לנסות ולהכיר טוב יותר כיצד מתייחס כל הורה למעורבות הילד בהתנסויות מוסיקליות שונות וכיצד הוא תופס זאת מאז שהילד הושתל.

אנא שים-לב כי כל השאלות מתייחסות לתקופה שעברה **מאז** שהילד הושתל!

בכל שאלה, אנא סמן בעיגול את האות ו/או המילה (למשל, רוב הזמן, לעתים רחוקות, וכו') המייצגת בצורה הטובה ביותר את התנהגות ילדך. בנוסף, קיים ערך רב להערות נוספות בכתב ידך. במידה והדבר נדרש, אנא, הוסף זאת במקום המיועד לכך.

בחלק מהשאלות מופיעה המלה 'ספונטאני'. הסיבה לכך היא העניין שיש לי במחקר זה בתגובות של הילד הבאות מיוזמתו ולא כאלו שבאו כתגובה לעידוד או רמיזה מצד אחד מבני המשפחה להגיב בצורה מסוימת.

אנא, ענה על השאלות בצורה הכנה ביותר האפשרית.  
אם ישנם מקרים קבועים בהם המוסיקה אינה נעימה לילדך, או שהילד מגיב בצורה שלילית ובעקביות לסוגים מסוימים של מוסיקה, אנא כתוב זאת. אני מעוניינת מאוד לדעת על כך.

כשנדרש לסמן מלה מסוימת, השתמש במפתח הבא:  
**כמעט תמיד:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-90% מהזמן.  
**לעתים קרובות:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-75% מהזמן.  
**לפעמים:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-50% מהזמן.  
**לעתים רחוקות:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-25% מהזמן.  
**אף פעם:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו 0% מהזמן.

**בתשובה לשאלה בה נדרש שימוש במפתח זה, אנא שים לב שאתה מסמן רק אחת מהאפשרויות הנ"ל כתשובתך.**

**1. כיצד מגיב הילד באופן ספונטאני למוסיקה המושמעת בבית באמצעות רדיו, טייפ או נגן דיסקים (לא באמצעות טלביזיה או וידאו)?**  
**הערה:** בתנאי שהמוסיקה הושמעה בעוצמה שהיא מעל סף השמיעה של הילד עם השתל.

**א. מציין בצורה כלשהי שהוא מאזין על ידי:**

• סימון כלשהו ביד

אף פעם   לעתים רחוקות   לפעמים   לעתים קרובות   כמעט תמיד

• חיוך

אף פעם   לעתים רחוקות   לפעמים   לעתים קרובות   כמעט תמיד



▪ מעקב אחרי מקור הצליל  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ב. מנסה להשמיע קולות (לא שר אלא רק משמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ג. מגיב בתגובה מוטורית כלשהי כגון- נדנוד מצד לצד, קפיצה, עשיית תנועות של ריקוד וכד'  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ד. מוחא כפיים  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ה. מתעלם מהמוסיקה  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ו. תמיד מוחה כנגד ומבקש להפסיק כל מוסיקה  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ז. מוחה כנגד ומבקש להפסיק מוסיקה מסוימת  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ח. מנסה לשיר (כלומר, להפיק מנגינה, לא רק להשמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ט. בצורה אחרת. הסבר: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. האם קיים בביתכם כלי נגינה כלשהו? (א) כן (ב) לא  
אם כן, איזה כלי או אילו כלים?

האם מישו מבני הבית מנגן כיום בכלי/זה/אלו? (א) כן (ב) לא  
אם 'כן', כיצד מגיב הילד באופן ספונטאני לנגינה?  
א. מציין בצורה כלשהי שהוא מאזין על ידי:

▪ סימון כלשהו ביד  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

▪ חיוך  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

▪ מעקב אחרי מקור הצליל  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ב. מנסה להשמיע קולות (לא שר אלא רק משמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ג. מגיב בתגובה מוטורית כלשהי כגון- נדנוד מצד לצד, קפיצה, עשיית תנועות של ריקוד וכד'  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

## ד. מוחא כפיים

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

## ה. מתעלם מהמוסיקה

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ו. תמיד מוחה כנגד ומבקש להפסיק כל מוסיקה

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ז. מוחה כנגד ומבקש להפסיק מוסיקה מסוימת

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

## ח. מנסה לשיר (כלומר להפיק מנגינה, לא רק להשמיע קולות)

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

## ט. תגובות אחרות. הסבר:

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האם הילד מנסה לנגן בכלים/זה/אלו? (א) כן (ב) לא

אם כן, אנא הסבר:

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3. האם קיימת מוסיקה כלשהי או צלילים מסוימים שהילד אוהב להאזין להם? (א) כן (ב) לא

אם 'כן', מהן ההעדפות שלו?

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האם הוא מבקש להאזין לכך על-ידי כך שהוא:

(א) מביא לך קלטת ו/או דיסק? (א) כן (ב) לא

(ב) מדליק בעצמו את הרדיו/טייפ/נגן דיסקים? (א) כן (ב) לא

(ג) מגיב בצורה אחרת. הסבר:

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4. האם קיימת מוסיקה כלשהי או צלילים מסוימים שהילד אינו אוהב להאזין להם? (א) כן (ב) לא

אם 'כן', איזו מוסיקה ו/או צלילים?

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כיצד הוא מראה את אי-שביעות רצונו?

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5\*. האם קיימות פעילויות מוסיקליות מסוימות או מצבי האזנה המעודדים הנאה מוסיקלית של ילדך? למשל, סביבת האזנה שקטה, ציוד איכותי להשמעת מוסיקה, מוסיקה מוקלטת לעומת מוסיקה חיה, סוג המוסיקה או כלי הנגינה, עוצמת המוסיקה, וכד'. (א) כן (ב) לא  
אנא הסבר:

6\*. האם קיימות פעילויות מוסיקליות מסוימות או מצבי האזנה **שאינם** מעודדים הנאה מוסיקלית של ילדך? למשל, רעש מתחרה שמפריע להאזנה, ציוד שאינו איכותי להשמעת מוסיקה, מוסיקה מוקלטת לעומת מוסיקה חיה, סוג המוסיקה או כלי הנגינה, עוצמת המוסיקה, וכד'. (א) כן (ב) לא  
אנא הסבר:

7. האם אתה מנסה לשיר לילד, מדי פעם, מאז שהושתל? (א) כן (ב) לא  
אם כן, האם תוכל לציין דוגמאות לשירים אלו?

כיצד הילד מגיב באופן ספונטאני לשירה?

א. מציין בצורה כלשהי שהוא מאזין על ידי:

▪ סימון כלשהו ביד

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

▪ חיוך

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ב. מנסה להשמיע קולות

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ג. מגיב בתגובה מוטורית כלשהי כגון- נדנוד מצד לצד, קפיצה, עשיית תנועות של ריקוד וכד'

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ד. מוחא כפיים

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ה. מתעלם מהשירה שלך

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ו. תמיד מוחא כנגד ומבקש להפסיק שיר מסוים (או את השירים)

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

\* שאלה זו נלקחה ממאמר של גפּלר ואחרים (1999), נספח 1.

ז. מוחה כנגד ומבקש להפסיק שיר מסוים (או שירים מסוימים)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ח. מנסה לשיר (כלומר, להפיק מנגינה, לא רק להשמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ט. תגובות אחרות. הסבר: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. האם אתה מנסה להציג לילד קלטת או דיסק עם מוסיקה למטרת האזנה?  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד  
אם כן, לאיזו/אילו קלטת/ות או דיסק/ים? \_\_\_\_\_

כיצד הילד מגיב להצעה שלך? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. האם הילד משחק במשחקים/צעצועים המשמיעים צלילים באופן שונה לעומת האופן בו שיחק איתם  
לפני ההשתלה? (א) כן (ב) לא  
אם כן, אנא תאר זאת: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

האם ילדך נהנה כיום ממשחקים/צעצועים המשמיעים צלילים למטרת השמעת צלילים?  
(1) אף פעם

(2) לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

(3) לא ברור מספיק האם הוא משחק איתם למטרת השמעת צלילים

אם תשובתך היא (2), אנא הסבר (אילו צעצועים/משחקים, מתי וכו'): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. האם אתה מנסה להציג לילד להרכיב אזניות ולהאזין למוסיקה באמצעותן?  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד  
אם כן, כיצד הגיב הילד? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
האם תוכל לציין באיזה סוג אזניות השתמשת? \_\_\_\_\_

11. האם יש אדם אחר מבני המשפחה מלבד ההורים (כגון אח, אחות, סבא או סבתא וכו') המזמן לילד  
התנסות מוסיקלית נוספת (כולל שירה)? (א) כן (ב) לא  
אם 'כן', מיהו אותו אדם (או אנשים)? \_\_\_\_\_

\_\_\_\_\_

מהי אותה התנסות/התנסויות? \_\_\_\_\_

\_\_\_\_\_

כיצד הילד מגיב לכך? \_\_\_\_\_

\_\_\_\_\_

**12.** אם יש לך הערות נוספות העשויות לזרוע אור נוסף על המעורבות וההתנהגויות של ילדך ביחס למוסיקה, אנא הוסף אותן כאן: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**13.** לאור ההסברים שקבלת על המחקר לפני שחתמת על טופס ההסכמה, אילו ציפיות יש לך ממחקר זה? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

תודה רבה על מילוי השאלון!

בברכה,

דקלה כרם

## Appendix J

### Appendix J1: Parent post-intervention questionnaire

Completed by father/mother (Please circle)

Date: \_\_\_\_\_

First name of your child: \_\_\_\_\_ Last name: \_\_\_\_\_

Child's date of birth: \_\_\_\_\_ Phone no.: \_\_\_\_\_ Mobile phone: \_\_\_\_\_

Date of cochlear implantation: \_\_\_\_\_ Type of CI: \_\_\_\_\_

This questionnaire will be filled out separately by you and your spouse.

The purpose of this questionnaire is to become more familiar with how each parent relates to the child's involvement with music **since the child was implanted and since the music therapy intervention and the play sessions.**

According to the question, please circle the letter and/or word on the scale (i.e., Most of the time, frequently, etc.), which most closely represents what you think. In addition, please add any comments or explanations if needed.

In some questions, the word 'spontaneously' appears. The reason is that I am interested in how your child responds without anybody cueing or trying to encourage her/him to respond.

Please answer this questionnaire as candidly as you can. If there are consistent times when music is not pleasant for your child, or a consistently bad response to certain types of music, we would like to know that.

When required, use the following key to mark your responses:

**Most of the time:** When presented with the opportunity, your child responds in this manner about 90% of the time.

**Frequently:** When presented with the opportunity, your child responds in this manner about 75% of the time.

**Occasionally:** When presented with the opportunity, your child responds in this manner about 50% of the time.

**Seldom:** When presented with the opportunity, your child responds in this manner about 25% of the time.

**Never:** When presented with the opportunity, your child responds in this manner 0% of the time.

**When answering a question of this type, please pay attention that you circle *only one* of the above mentioned keys as your answer.**

1. How does your child spontaneously respond to music which is heard at home via tape recorder, radio, or CD player (**not** including TV or videos)?

Note: The music must be at a volume above the child's threshold of hearing.

(a) Indicates somehow that he is listening by-

(i) Signing with her/his hand  
Never Seldom Occasionally Frequently Most of the time

(ii) Smiling  
Never Seldom Occasionally Frequently Most of the time

(iii) Watching the source of the music in an attentive way  
Never Seldom Occasionally Frequently Most of the time

(b) Tries to vocalize (i.e., not singing, just making sounds with the voice)

Never Seldom Occasionally Frequently Most of the time

(c) Shows a motoric response such as swaying, jumping, dance movements, etc.

Never Seldom Occasionally Frequently Most of the time

(d) Claps hands

Never Seldom Occasionally Frequently Most of the time

(e) Ignores the music

Never Seldom Occasionally Frequently Most of the time

(f) Always protests and asks to stop any music

Never Seldom Occasionally Frequently Most of the time

(g) Protests and asks to stop specific music

Never Seldom Occasionally Frequently Most of the time

(h) Tries to sing (i.e., to produce a melody, not only sounds)

Never Seldom Occasionally Frequently Most of the time

(i) Other responses. Explanation: \_\_\_\_\_

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2. Have you purchased a musical instrument since this research has started?

(a) Yes (b) No

If 'Yes', what kind of instrument(s)? \_\_\_\_\_

Does any family member at home play this (or these) instrument(s)?

(a) Yes (b) No

If 'Yes', how does the child spontaneously respond to the playing?

(a) Indicates somehow that he is listening by-

(i) Signing with her/his hand  
Never Seldom Occasionally Frequently Most of the time

(ii) Smiling  
Never Seldom Occasionally Frequently Most of the time

(iii) Watching the source of the music in an attentive way  
Never Seldom Occasionally Frequently Most of the time

(b) Tries to vocalize (i.e., not singing, just making sounds with the voice)

Never Seldom Occasionally Frequently Most of the time

(c) Shows a motoric response such as swaying, jumping, dance movements etc.

Never Seldom Occasionally Frequently Most of the time

(d) Claps hands

Never Seldom Occasionally Frequently Most of the time

(e) Ignores the music

Never Seldom Occasionally Frequently Most of the time

(f) Always protests and asks to stop any music

Never Seldom Occasionally Frequently Most of the time

(g) Protests and asks to stop specific music

Never Seldom Occasionally Frequently Most of the time

(h) Tries to sing (i.e., to produce a melody, not only sounds with the voice)

Never Seldom Occasionally Frequently Most of the time

(i) Other responses. Explanation: \_\_\_\_\_

\_\_\_\_\_

Does the child try to produce sounds with this (these) instrument(s)?

Never Seldom Occasionally Frequently Most of the time

If s/he does, please describe:

\_\_\_\_\_

**3.** Are there certain musical sounds or music that your child likes to listen to?

(a) Yes (b) No

If 'Yes', what are her/his preferences? \_\_\_\_\_

\_\_\_\_\_

Does s/he ask to listen to it by

(a) Bringing a CD/tape to you? (i) Yes (ii) No

(b) Turning on the radio/tape/CD player? (i) Yes (ii) No

(c) Other responses. Explanation: \_\_\_\_\_

\_\_\_\_\_

**4.** Are there certain musical sounds or music that your child seems to dislike? (a) Yes

(b) No

If 'Yes', what sounds or music? \_\_\_\_\_

How does s/he show her/his dislike? \_\_\_\_\_

\_\_\_\_\_



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**5\***. Are there particular types of music activities or types of listening situations that enhance musical enjoyment for your child? For example, a quiet listening environment, good quality sound equipment, live vs. recorded music, type of music or instrument, volume of music, etc. (a) Yes (b) No

Please explain: \_\_\_\_\_

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**6\***. Are there particular types of music activities or types of listening situations that make music less enjoyable for your child? For example, competing noise, poor quality sound equipment, live vs. recorded music, type of music or instrument, volume of music, etc. (a) Yes (b) No

Please explain: \_\_\_\_\_

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**7.** Do you sometimes sing to your child?

Never   Seldom   Occasionally   Frequently   Most of the time

If you do, can you give some examples of these songs? \_\_\_\_\_

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How does the child spontaneously respond to your singing?

(a) Indicates somehow that he is listening by-

(i) Signing with her/his hand

Never   Seldom   Occasionally   Frequently   Most of the time

(ii) Smiling

Never   Seldom   Occasionally   Frequently   Most of the time

(iii) Watching your face in an attentive way

Never   Seldom   Occasionally   Frequently   Most of the time

(b) Tries to vocalize (i.e., not singing, just making sounds with the voice)

Never   Seldom   Occasionally   Frequently   Most of the time

(c) Shows a motoric response such as swaying, jumping, dance movements etc.

Never   Seldom   Occasionally   Frequently   Most of the time

(d) Claps hands

Never   Seldom   Occasionally   Frequently   Most of the time

(e) Ignores your singing

Never   Seldom   Occasionally   Frequently   Most of the time

---

\* This question was copied from Gfeller et al. (1999), Appendix 1.

(f) Always protests and asks to stop any singing

Never Seldom Occasionally Frequently Most of the time

(g) Protests and asks to stop singing a specific song (or songs)

Never Seldom Occasionally Frequently Most of the time

(h) Tries to sing (i.e., to produce a melody, not only sounds)

Never Seldom Occasionally Frequently Most of the time

(i) Other responses. Explanation: \_\_\_\_\_

\_\_\_\_\_

**8.** Have you tried to offer the child a cassette tape or a CD with music to listen to?

Never Seldom Occasionally Frequently Most of the time

If you have, what tape(s) and/or CD ('s)?

\_\_\_\_\_

\_\_\_\_\_

How has the child responded to your offer?

\_\_\_\_\_

\_\_\_\_\_

**9.** Is your child's use of sound games and toys different from how s/he played with them prior to the implantation? (a) Yes (b) No (c) I have not paid attention to that  
If 'Yes', could you please describe it: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Does s/he currently enjoy playing with the sound games and toys for the purpose of producing sounds?

(i) Never

(ii) Seldom Occasionally Frequently Most of the time

(iii) It is not clear enough whether s/he plays with them in order to produce sounds.

If your answer is (ii), please explain (what toys/games, when, etc.):

\_\_\_\_\_

\_\_\_\_\_

**10.** Have you ever tried to offer your child headphones to wear for listening to music?

Never Seldom Occasionally Frequently Most of the time

If you have, can you describe the child's reaction?

\_\_\_\_\_

\_\_\_\_\_

What type of earphones did you use? \_\_\_\_\_

**11.** Is there another member of the family (such as sister or brother, grandmother grandfather, etc) who provides the child with an additional music experience (including singing)?

(a) Yes (b) No

If 'Yes', who is that person (or persons)? \_\_\_\_\_

What kind of experience(s)? \_\_\_\_\_

\_\_\_\_\_

How does the child respond to that? \_\_\_\_\_

\_\_\_\_\_

**12.** If you have any further comments, which you think might shed additional light on your child's musical behavior, please add them: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**13.** Your expectations prior to the start of the research were as follows: "....."  
(Copied from the questionnaire that was filled out before the research began).  
According to what you have seen so far, were these expectations fulfilled? Please explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank you very much for completing this questionnaire!

Sincerely,

Dikla Kerem

## נספח J

### נספח J2: שאלון להורה לאחר ההתערבות

ממלא/ת השאלון: אם / אב (סמן בעיגול)

תאריך מלוי השאלון: \_\_\_\_\_

שם פרטי של הילד: \_\_\_\_\_ שם משפחה: \_\_\_\_\_ תאריך לידה: \_\_\_\_\_  
טל. בבית: \_\_\_\_\_ טל. נייד: \_\_\_\_\_ תאריך ההשתלה: \_\_\_\_\_  
סוג השתל: \_\_\_\_\_

שאלון זה ימולא **בנפרד** על-ידיך ועל-ידי בן/בת זוגך.  
כדי למנוע סרבול, נכתב השאלון בלשון זכר, אך הינו מיועד לשני המינים.

מטרת השאלון היא לנסות ולהכיר טוב יותר כיצד מתייחס כל הורה למעורבות הילד בהתנסויות מוסיקליות שונות וכיצד הוא תופס זאת **מאז שהילד הושלל וכן מאז שקיבל טיפול במוסיקה ומשחק**.

בכל שאלה, אנא סמן בעיגול את האות ו/או המילה (למשל, רוב הזמן, לעתים רחוקות, וכו') המייצגת בצורה הטובה ביותר את התנהגות ילדך. בנוסף, קיים ערך רב להערות נוספות בכתב ידך. במידה והדבר נדרש, אנא, הוסף זאת במקום המיועד לכך.

בחלק מהשאלות מופיעה המלה 'ספונטאני'. הסיבה לכך היא העניין שיש לי במחקר זה בתגובות של הילד הבאות מיוזמתו ולא כאלו שבאו כתגובה לעידוד או רמיזה מצד אחד מבני המשפחה להגיב בצורה מסוימת.

אנא, ענה על השאלות בצורה הכנה ביותר האפשרית.  
אם ישנם מקרים קבועים בהם המוסיקה אינה נעימה לילדך, או שהילד מגיב בצורה שלילית ובעקביות לסוגים מסוימים של מוסיקה, אנא כתוב זאת. אני מעוניינת מאוד לדעת על כך.

כשנדרש לסמן מלה מסוימת, השתמש במפתח הבא:  
**כמעט תמיד:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-90% מהזמן.  
**לעתים קרובות:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-75% מהזמן.  
**לפעמים:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-50% מהזמן.  
**לעתים רחוקות:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו בכ-25% מהזמן.  
**אף פעם:** כשניתנת לו ההזדמנות, מגיב הילד בצורה זו 0% מהזמן.

**בתשובה לשאלה בה נדרש שימוש במפתח זה, אנא שים לב שאתה מסמן רק אחת מהאפשרויות הנ"ל כתשובתך.**

**1.** כיצד מגיב הילד באופן ספונטאני למוסיקה המושמעת בבית באמצעות רדיו, טייפ או נגן דיסקים (**לא** באמצעות טלביזיה או וידאו)?  
**הערה:** בתנאי שהמוסיקה הושמעה בעוצמה המאפשרת לו לשמוע אותה (כלומר, מעל סף השמיעה של הילד עם השתל!).

**א.** מציין בצורה כלשהי שהוא מאזין על ידי:

• סימון כלשהו ביד

אף פעם    לעתים רחוקות    לפעמים    לעתים קרובות    כמעט תמיד

• חיך

אף פעם    לעתים רחוקות    לפעמים    לעתים קרובות    כמעט תמיד

▪ מעקב אחרי מקור הצליל  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ב. מנסה להשמיע קולות (לא שר אלא רק משמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ג. מגיב בתגובה מוטורית כלשהי כגון- נדנוד מצד לצד, קפיצה, עשיית תנועות של ריקוד וכד'  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ד. מוחא כפיים  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ה. מתעלם מהמוסיקה  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ו. תמיד מוחה כנגד ומבקש להפסיק כל מוסיקה  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ז. מוחה כנגד ומבקש להפסיק מוסיקה מסוימת

ח. מנסה לשיר (כלומר, להפיק מנגינה, לא רק להשמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ט. תגובות אחרות. הסבר: \_\_\_\_\_

2. האם רכשתם כלי נגינה כלשהו מאז שהחל המחקר? (א) כן (ב) לא  
אם כן, איזה כלי או אילו כלים?

האם מישוהו מבני הבית מנגן כיום בכלי/ם זה/אלו? (א) כן (ב) לא  
אם 'כן', כיצד מגיב הילד באופן ספונטאני (מיזמתו) לנגינה?  
א. מציין בצורה כלשהי שהוא מאזין על ידי:

▪ סימון כלשהו ביד  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

▪ חיוך  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

▪ מעקב אחרי מקור הצליל  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ב. מנסה להשמיע קולות (לא שר אלא רק משמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ג. מגיב בתגובה מוטורית כלשהי כגון- נדנוד מצד לצד, קפיצה, עשיית תנועות של ריקוד וכד'  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ד. מוחא כפיים  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ה. מתעלם מהמוסיקה

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ו. תמיד מוחה כנגד ומבקש להפסיק כל מוסיקה

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ז. מוחה כנגד ומבקש להפסיק מוסיקה מסוימת

ח. מנסה לשיר (כלומר, להפיק מנגינה, לא רק להשמיע קולות)

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ט. תגובות אחרות. אנא הסבר:

3. האם קיימת מוסיקה כלשהי או צלילים מסוימים שהילד אוהב להאזין להם? (א) כן (ב) לא  
אם 'כן', מהן ההעדפות שלו?

האם הוא מבקש להאזין לכך על-ידי כך שהוא:

(א) מביא לך קלטת ו/או דיסק? (א) כן (ב) לא

(ב) מדליק בעצמו את הרדיו/טייפ/נגן דיסקים? (א) כן (ב) לא

(ג) מגיב בצורה אחרת. הסבר:

4. האם קיימת מוסיקה כלשהי או צלילים מסוימים שהילד אינו אוהב להאזין להם? (א) כן (ב) לא  
אם 'כן', איזו מוסיקה ו/או צלילים?

כיצד הוא מראה את אי-שביעות רצונו?

\*5. האם קיימות פעילויות מוסיקליות מסוימות או מצבי האזנה המעודדים הנאה מוסיקלית של ילדך?  
למשל, סביבת האזנה שקטה, ציוד איכותי להשמעת מוסיקה, מוסיקה מוקלטת לעומת מוסיקה חיה, סוג  
המוסיקה או כלי הנגינה, עוצמת המוסיקה, וכד'. (א) כן (ב) לא  
אנא הסבר:

\* שאלה זו נלקחה ממאמר של גפנר ואחרים (1999), נספח 1.

6\*. האם קיימות פעילויות מוסיקליות מסוימות או מצבי האזנה **שאינם** מעודדים הנאה מוסיקלית של ילד? למשל, רעש מתחרה שמפריע להאזנה, ציוד שאינו איכותי להשמעת מוסיקה, מוסיקה מוקלטת לעומת מוסיקה חיה, סוג המוסיקה או כלי הנגינה, עוצמת המוסיקה, וכד'. (א) כן (ב) לא  
אנא הסבר:

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7. האם אתה מנסה לשיר לילד מדי פעם? (א) כן (ב) לא  
אם כן, האם תוכל לציין דוגמאות לשירים אלו?

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כיצד הילד מגיב באופן ספונטאני לשירה?  
א. מציין בצורה כלשהי שהוא מאזין על ידי:

• סימון כלשהו ביד  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

• חיוך  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

• מעקב אחרי מקור הצליל  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ב. מנסה להשמיע קולות (לא שר אלא רק משמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ג. מגיב בתגובה מוטורית כלשהי כגון- נדנוד מצד לצד, קפיצה, עשיית תנועות של ריקוד וכד'  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ד. מוחא כפיים  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ה. מתעלם מהשירה שלך  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ו. תמיד מוחה כנגד ומבקש להפסיק כל מוסיקה  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ז. מוחה כנגד ומבקש להפסיק שיר מסוים (או שירים מסוימים)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

ח. מנסה לשיר (כלומר להפיק מנגינה, לא רק להשמיע קולות)  
אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

\* שאלה זו נלקחה ממאמר של גפנר ואחרים (1999), נספח 1.

ט. תגובות אחרות. הסבר:

8. האם אתה מנסה להציע לילד קלטת או דיסק עם מוסיקה למטרת האזנה? אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד אם כן, לאיזו/אילו קלטת/ות או דיסק/ים?

כיצד הילד מגיב להצעה שלך?

9. האם הילד משחק במשחקים/צעצועים המשמיעים צלילים באופן שונה לעומת האופן בו שיחק אתם לפני ההשתלה? (א) כן (ב) לא אם כן, אנא תאר זאת:

האם ילדך נהנה כיום ממשחקים/צעצועים המשמיעים צלילים למטרת השמעת צלילים? (1) אף פעם

(2) לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

(3) לא ברור מספיק האם הוא משחק איתם למטרת השמעת צלילים

אם תשובתך היא (2), אנא הסבר (אילו צעצועים/משחקים, מתי וכו')

10. האם אתה מנסה להציע לילד להרכיב אזניות ולהאזין למוסיקה באמצעותן?

אף פעם לעתים רחוקות לפעמים לעתים קרובות כמעט תמיד

אם כן, כיצד הגיב הילד?

האם תוכל לציין באיזה סוג אזניות השתמשת?

11. האם יש אדם אחר מבני המשפחה מלבד ההורים (כגון אח, אחות, סבא או סבתא וכו') המזמן לילד התנסות מוסיקלית נוספת (כולל שירה)? (א) כן (ב) לא

אם 'כן', מיהו אותו אדם (או אנשים)?

מהי אותה התנסות/התנסויות?

כיצד הילד מגיב לכך?



**12.** אם יש לך הערות נוספות העשויות לזרוע אור נוסף על המעורבות וההתנהגויות של ילדך ביחס למוסיקה, אנא הוסף אותן כאן: \_\_\_\_\_

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**13.** ציפיותיך לפני המחקר (הועתק מהשאלון שמלאת לפני תחילת המחקר) היו כדלקמן: " \_\_\_\_\_

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לאור מה שראית עד כה, האם ציפיות אלו התממשו? אנא הסבר: \_\_\_\_\_

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תודה רבה על מילוי השאלון!

בברכה,

דקלה כרם

## **Appendix K**

# **The Parent-Child Early Relational Assessment**

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Preparation of this assessment was assisted by NIMH Grants MH 281423 and MH 17139, the Department of Psychiatry, University of Wisconsin Medical School, and Fellowship support from the National Center for Clinical Infant Programs.

## **The Parent-Child Early Relational Assessment<sup>1</sup>**

The purpose of The Early Relational Assessment is to attempt to capture the infant/child's experience of the parent, the parent's experience of the child, the affective and behavioral characteristics that each brings to the interaction and the quality of the tone of the relationship. This is an assessment of the areas of strength and the areas of concern in the parent, the child and the dyad. Profiles maybe developed for use in focusing clinical intervention efforts, program evaluation and research with families at risk for early relational disturbances.

### **Observation/Videotaping of the Parent-Child Interaction**

For the purpose of observing the parent-child interaction and to assist in assessing current relationship issues in the dyad, parents and children are videotaped for four 5-minute segments of 1) feeding, 2) structured task, 3) free play, and 4) separation/reunion.

Each of the four situations provides a window for understanding what has been shared in the parent-child relationship. Each situation is experienced differently with some eliciting conflictual feelings and others allowing for feelings of competence in the parenting role.

The Feeding Situation allows us to assess the parent's capacity for nurturing and social interaction as well as the sensitivity to the child's cues and need for regulation. The child's readability, affect regulation, social initiative and responsivity during feeding may also be assessed. Comfort, tension, and regulation of the dyad in this situation is observed.

The Structured Task allows us to observe the parent's capacity to structure and mediate the environment according to the child's developmental and individual needs. Some of the tasks tap the child's emerging abilities and require adult cognitive scaffolding and emotional availability in order for the child to complete the task successfully. The child's attentional skills, persistence and interest in complying with parental expectations in a structured situation are observed. The dyad's capacity for joint attention to an activity, reciprocity in negotiations and mutuality may be assessed.

The Free Play situation allows us to assess the parents' capacity to be playful with and enjoy their child, to facilitate their child's capacity for exploratory and representational play. In addition, the dyad's capacity for social interaction, mutuality and reciprocity can be observed.

The Separation/Reunion episode allows us to assess the parents' ability and level of comfort in preparing the child for a brief separation. The child's capacity for self-regulation and quality of mood and exploratory play during the parents' absence is assessed. The dyad's quality of affect and engagement at reunion may also be observed.

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<sup>1</sup> Only items that were rated in this study are presented in this appendix (Dikla Kerem).

## Instructions to Raters

This is a global rating instrument to be scored after continuous viewing of one entire five-minute videotape of parent-child interaction. It is recommended that the tape be reviewed a minimum of seven to eight passes through and that no more than ten items be scored after each viewing.

In determining how to rate each item on a scale from 1-5, it is important to consider factors such as frequency, duration, and intensity of behavior. Each of these factors or any combination needs to be evaluated for this saliency for any given item. A semi-colon or period separating different examples for each rating signifies that one or the other example may be present for this rating. The N.R. (6) rating is used only when a particular item is not ratable.

For information regarding training, use and development of the scale, write:

Roseanne Clark, Ph.D  
Department of Psychiatry  
University of Wisconsin Medical School  
6001 Research Park Blvd.  
Madison, Wisconsin 53719  
(608) 263-6067  
Fax: 608-263-0265  
e-mail: rclark@facstaff.wisc.edu

## 6-10 PARENT'S CHARACTERISTIC MOOD

Mood is a pervasive and sustained emotion that in the extreme markedly colors the person's perception of the world. Mood can be inferred by affect, i.e., an immediately expressed and observed emotion. Mood is to affect as climate is to weather (DSM -III, Spitzer, R., et al. 1980).

### (6) Angry, Hostile Mood

This may be reflected in hostile, irritable or angry behavior and/or facial expressions; annoyance or irritability; tone of voice; content of vocalizations; posture. Consider intensity and duration of expressed affect over five-minute segment.

- 1 = Extremely or characteristically hostile or angry mood, i.e., attitude and affect.
- 2 = Marked expression of anger and hostility; some modulation in intensity and duration. Angry mood not quite characteristic.
- 3 = Moderately angry, irritable or hostile. Quality of anger, irritability or hostility is not intense.
- 4 = Slight annoyance, irritability, hostility or brief, fleeting episode of anger. Pervasive mood without anger.
- 5 = No anger displayed.
- 6 = N.R.

### (7) Depressed, Withdrawn, Apathetic Mood

This may be reflected in sad, flattened, or constricted range of affect, lack of animation in facial expression, few or sluggish movements and/or little expression of energy, expressed helplessness or hopelessness, self-absorption, verbalizations

indicating negative perceptions or perceptions of rejection, anaerobia, or little interest in activities or interactions. Consider intensity and duration over five-minute segment.

- 1 = Extreme apathy; withdrawal; depression; sadness; a picture of lifelessness. Behaviorally characterized by little or no movement; little or no interaction.
- 2 = Depression; withdrawn; very flat affect. Less intense or pervasive than #1.
- 3 = Moderately depressed or flattened mood; withdrawn moderate amount of the time.
- 4 = Slight withdrawal; slight depression; one or two brief instance. Not pervasive mood.
- 5 = No evidence of apathy, depression or withdrawal.
- 6 = N.R.

### **(8) Anxious Mood**

Anxiety should not be inferred, but manifested in such actions as motor tension, heightened motor activity, apprehension, agitation, vigilance, and scanning; also can include facial expressions and quality and content of speech (e.g. staccato, edge).

- 1 = Extreme, characteristic anxiety is reflected in the amount, intensity and duration of above indicators.
- 2 = Considerable anxiety. Less intense or pervasive than #1.
- 3 = Moderate intensity or amount of anxiety.
- 4 = Slight anxiety or presence of one or two brief instances.
- 5 = No anxiety or tension; easy going, relaxed.
- 6 = N.R.

### **(9) Enthusiastic, Animated, and Cheerful Mood. "Joie de Vivre"**

This may be reflected in energy level, facial expression, cheerfulness positive tone and content of verbalizations.

- 1 = Totally unenthusiastic, not cheerful.
- 2 = Slight evidence of enthusiasm; one or two brief occasions of liveliness.
- 3 = Moderate enthusiasm; cheerful.
- 4 = Considerable amount of enthusiasm or cheerfulness present. Not characteristic.
- 5 = Characteristically enthusiastic; animated; cheerful; lively.
- 6 = N.R.

## **13-24 PARENTAL AFFECTIVE AND BEHAVIORAL INVOLVEMENT**

Parental interactions with one's child are assessed in number of areas. The quality of interactions may be reflected in parent's sensitivity and involvement.

### **(13) Quality and Amount of Physical Contact: Positive**

This variable assesses the **quality** and **amount** of positive physical contact experienced by child. This may include gentle, sensitive handling, cuddling, caresses, warm touches and hugs.

- 1 = No instances of gentle, warm, or sensitive touching observed.
- 2 = Slight instances.
- 3 = Moderate amount of gentle, warm, or sensitive touching.
- 4 = Considerable; not characteristic.

- 5 = Characteristic; frequently touches and/or holds child in a gentle sensitive, or warm manner.
- 6 = N.R.

**(14) Quality and Amount of Physical Contact: Negative**

This variable assesses the **quality** and **amount** of negative physical contact experienced by child. This may range from awkward, abrupt, disruptive and/or insensitive handling to intense tickling and/or rough-and-tumble play to physical restraint, slapping, pinching, and/or hitting.

- 1 = Characteristic; frequent negative contact or restraint of child.
- 2 = Considerable. Not characteristic.
- 3 = Moderate amount of negative contact or restraint of child
- 4 = Slight instances.
- 5 = No instances of negative contact or restraint of child
- 6 = N.R.

**(19) Contingent Responsivity to Child's Positive or Age-Appropriate Behavior**

This variable measures how quickly and frequently a parent responds based on the child's actions or cues. Responses may be verbal, facial or gestural. The key factor in this variable is the rapidity and regularity with which the parent responds to the child's non-negativistic or age-appropriate behavior. There is the sense that the child feels that these actions have an affect on the parent.

- 1 = No evidence of contingent responses.
- 2 = Contingent responses are rare and/or delayed.
- 3 = Some instances of contingent responsivity or somewhat delayed or absent responses.
- 4 = Usually contingently responsive; a few instances of delay or absence of response.
- 5 = Characteristically contingently responsive.
- 6 = N.R.

**(20) Contingent Responsivity to Child's Negative or Unresponsive Behavior**

This variable measures how quickly and frequently a parent responds based on the child's actions or cues. Responses may be verbal, facial or gestural. For young infants this may include fussiness and/or turning away; for older children this may include ignoring, disengaging, aversive behavior, being physically aggressive, demanding or noncompliant behavior. There is the sense that the child feels that these actions have an effect on the parent. Rate this variable for instances in which the parent appears to experience child's behavior as resistant or "bad".

- 1 = Characteristically contingently responsive to child's negative behavior.
- 2 = Usually contingently responsive to negative behavior; a few instances of delay or absences of response.
- 3 = A few instances of contingent responsivity or somewhat delayed responses to negative behavior; ignoring or absent responses.
- 4 = Contingent responses to negative behavior are rare and/or delayed.
- 5 = No evidence of contingent responses to child's negative behavior.

6 = N.R.

### **(21) Structures and Mediates Environment**

This variable attempts to assess the parent as the child's first or auxiliary ago, i.e., a parent's demonstrated capacity to take the role of an adult caretaker as appropriate to the child's needs and to the task. This includes modulating affect and stimulation as well as facilitating the child's acquisition of skills and mastery of age-appropriate tasks. This can be measured by looking at the amount and the way in which s/he *gains, helps to focus, and sustains* the child's attention to the relevant aspects of the situation. The *scaffolding* provided by the parent may, with a younger infant, be manifested by good, protective caretaking. With an older child, this may include a quality of assistance such as teaching, demonstrating, clear statements of expectations, and limit setting with an awareness of where the child is affectively and cognitively. Quality includes effectiveness of parent's efforts.

- 1 = No instances of providing structure or mediation of environment; efforts to structure or mediate are completely ineffective.
- 2 = A few attempts to structure/mediate; efforts to structure or mediate are usually ineffective.
- 3 = Moderate amount or effectiveness of structuring/mediating.
- 4 = On most occasions takes role of adult caretaker where this is appropriate. Efforts to structure are usually effective.
- 5 = Characteristically takes role of adult caretaker. Efforts to structure are almost always effective.
- 6 = N.R.

### **(22) Parent Reads Child's Cues and Responds Sensitively and Appropriately**

This variable is composed of parent's ability to accurately observe the child's cues, to understand what the child needs and wants and to demonstrate the capacity to respond appropriately. This involves both empathic awareness and response. Raters should take into account parent's response in relation to child's age and developmental level. (For example, if an infant squirms, or shows discomfort in the way s/he is held, parent adjusts holding position; if an older infant tugs at mother's skirt, she responds to the need for attention by touching, talking, holding, etc.; if a preschool age child asks questions or seeks the parent's attentions for something s/he is doing, the parent responds by providing help, information, reassurance, or attention). This may also include comforting and soothing a child when s/he is distressed.

- 1 = Insensitive to child; oblivious, indifferent or unresponsive to child's cues; consistently misreads or misinterprets child's cues.
- 2 = Basically insensitive and/or oblivious to child's cues; minimal responsiveness to child's cues.
- 3 = Demonstrates some capacity to read child's cues and to respond somewhat appropriately.
- 4 = Reads child's cues and responds appropriately and sensitively most of the time.
- 5 = Very empathic, characteristically reads child's cues and responds sensitively and appropriately.
- 6 = N.R.

**(24) Mirroring**

This variable measures the behavioral indicators of the parent's *emotional availability* to or *attunement* with child's emotional state. This can be seen in the parent's reflection of the child's affect and/or behavior through echoing (with infants), gazing, confirming of affect, behavior approval, encouragement, and praise, as well as labeling of the child's internal feeling state. This may include but is more than imitation.

- 1 = No evidence of mirroring.
- 2 = Slight evidence; one or two instances of minimal intensity of mirroring.
- 3 = Some episodes of mirroring; three or four instances of mirroring.
- 4 = Considerable number of instances of mirroring.
- 5 = Optimal mirroring; characteristic.
- 6 = N.R.

**25-29 PARENTAL STYLE**

In addition to amount of interactional behaviors the child experiences in interaction with the parent, the parental style of caretaking and being with one's child are experienced as well. Style includes the manner, mode, and method of acting that is characteristic of the parent including posture and actions. This may include the manner in which the parent looks, touches, talks, holds, initiates and responds.

**(25) Flexibility/Rigidity**

This variable assesses the parent's demonstrated capacity for flexibility in relating to his/her child ranging from inflexible, controlled, stiff responses to infant/child's behavior to relaxed, spontaneous, flexible responses evidencing a capacity to follow child's lead, to adapt to changing circumstances or to generally be able to "shift gears".

- 1 = Very rigid, inflexible.
- 2 = Rigid; brief instances of flexibility.
- 3 = Moderate flexibility; some rigidity present.
- 4 = Mostly flexible or easy going.
- 5 = Characteristically flexible; easy going, spontaneous.
- 6 = N.R.

**(27) Intrusiveness**

This variable evaluates the parent's intrusiveness and over-involvement. This includes over-structuring, overcontrolling, interfering, overbearing, etc., so that the child's initiative is often thwarted. This over-involvement may be of a symbiotic nature and focus on the parent's interference and domination of the child. Child's age and task need to be taken into consideration.

- 1 = Very intrusive; domineering.
- 2 = Frequently intrusive; one or two instances of respect for child's initiative.
- 3 = Moderately intrusive.
- 4 = Slight intrusive behavior; one or two brief instances.
- 5 = Not at all intrusive; includes respecting child's autonomy.



6 = N.R.

**(28) Consistency/Predictability**

This variable refers to the predictability for the child of the parent's behavior and responses, e.g. clear consistent messages, congruent affect and contingent behavior responses are predictable over time and across modalities of expression (e.g. verbal, visual).

- 1 = Very inconsistent; extreme fluctuation in parent's style.
- 2 = Inconsistent; fluctuation more predominant than consistency.
- 3 = Somewhat consistent; some fluctuation evident.
- 4 = Consistent; slight fluctuations.
- 5 = Very consistent; predictable.
- 6 = N.R.

## Appendix L

### Parent interview form

#### Appendix L1: Parent interview form: English version

**Interviewer:** This interview will be carried out **individually**, at different times, with you and your spouse. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

1. What was the most enjoyable and/or thrilling moment for you? \_\_\_\_\_

\_\_\_\_\_

Why? \_\_\_\_\_

\_\_\_\_\_

2. What moment or part of a session did you like the least? \_\_\_\_\_

\_\_\_\_\_

Why? \_\_\_\_\_

\_\_\_\_\_

3. While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home? Please explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Does anything that you just saw in these short segments help you perceive and understand your child better? Please explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. Does anything that you just saw give you ideas about how to help your child? Please explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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7. Are there any characteristics of your child's behavior that you feel are missing in the video examples? Please give some examples: \_\_\_\_\_

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8\*. Can you compare your experience during the sessions with what you just experienced while watching the video segments? \_\_\_\_\_

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9. Your expectations prior to the start of the research trials were as follows: "....."

(copied from the questionnaire that was filled out before the research began).

According to what you have seen in the videotapes and/or at home, were these expectations fulfilled? Please explain: \_\_\_\_\_

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10. If you have any additional thoughts and/or comments, would you please share them: \_\_\_\_\_

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Thank you,

Sincerely,

Dikla Kerem

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\* This question should be asked only of the mothers who had attended all the sessions.

## נספח L

### טופס ראיון הורה

#### נספח L2: ראיון הורה - גרסה בעברית

ראיון זה יערך **בנפרד** לך ולבת/בן זוגך. ראשית, נצפה במשך 10 דקות בקטעי ווידאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. שאלות אלו מיועדות לעזור לך למקד את תגובותיך למספר אספקטים בווידיאו. לאחר שתענה/י על שאלות ספציפיות אלו, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתף/י ככל שתוכל/י באשר למה שראית והרגשת ביחס להשתתפות בנך/בתך בטיפול במוסיקה. אנא הרגש/הרגישי חופשי/ה לומר לי לעצור את הוידאו בכל רגע, במידה ותרצה/י להעיר הערה כלשהי.

1. מהו הרגע שהיה עבורך המהנה ו/או המרגש ביותר לצפייה? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ מדוע? \_\_\_\_\_

2. איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ מדוע? \_\_\_\_\_

3. בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של ילדך בביתכם? אנא הסבר/הסבירי בבקשה: \_\_\_\_\_

4. בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות** של ילדך? אנא הסבר/הסבירי בבקשה: \_\_\_\_\_

5. האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות ילדך טוב יותר? אנא הסבר/הסבירי בבקשה: \_\_\_\_\_

6. האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לילדך? אנא הסבר/הסבירי בבקשה: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. האם קיימים איפיונים התנהגותיים של ילדך שלא באו לידי ביטוי בקטעי הווידיאו שראית? אנא תן/י מספר דוגמאות: \_\_\_\_\_

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8\*. האם את יכולה להשוות את החוויה שלך בזמן הנוכחות שלך בפגישות לחוויית הצפייה כעת בקטעי הוידאו? \_\_\_\_\_

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9. ציפיותיך מהמחקר לפני תחילתו היו: ".....".  
(הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר). בהתאם למה שראית במהלך הפגישות וכן כעת בקטעי הווידיאו, האם צפיותיך התמלאו? אנא הסבר/הסבירי:

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10. במידה ויש לך הערות ו/או מחשבות נוספות, אנא שתף/י בבקשה: \_\_\_\_\_

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תודה על היענותך לראיון זה!

בברכה,  
דקלה כרם

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\* יש להפנות שאלה זו רק לאמהות שנכחו בכל הפגישות.

# **Appendix M**

## **Parent interviews**

## Appendix M1

### Interview of C's mother

**Interviewer:** This interview will be carried out individually, at different times, with you and your husband. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Mother:** The first video segment because one sees that she really talks. Even words. A real communication. It's obvious. The first segment was for sure exciting. Also the third and the fourth one.

**Interviewer:** Why? What was exciting in them?

**Mother:** Just like that, one sees all the communication, the understanding.

**Interviewer:** Her progress.

**Mother:** Yes, yes.

**Interviewer:** What moment or part of a session did you like the least?

**Mother:** None, I loved them all. All was nice.

**Interviewer:** Wasn't there anything that maybe disappointed you a bit, or maybe irritated you, made you a bit angry, or had a negative effect on you?

**Interviewer:** No, Dikla really made efforts to be nice to her, and to really bring out of her the best C could do.

**Interviewer:** Maybe something in C's behavior, maybe something that was a bit... Can you point at something like that?

**Mother:** For me, in general, it's no big deal. I will see only the good in her.

**Interviewer:** Ok, this we already know...

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain.

**Mother:** Yes, for example, the "bam, bam, bam" and the one with the microphone and that with the car- She really repeated those at home. I would show her a car and of course repeat it myself as well. She repeated it many times at home. I was excited because of that. This I really remember, and also the tambourines (The mother shows the movement). That she was... We don't have a tambourine at home. She used to do a certain movement to remind me that she did. It was nice.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Mother:** Regarding the same things? It wasn't the same things.

**Interviewer:** Or maybe even the same principles. Not exactly the same things, but the same principles.

**Mother:** What is different? I would have responded differently in a different place.

**Interviewer:** Right. Maybe the intention...

**Mother:** With the tape recorder, for example, it's the same at home. She tries to make it operate, but this is the same. But something different is not the same. It's already...

**Interviewer:** Maybe something in her imitation, in her responses or her laughter that is not the same.

**Mother:** But this is something different. I don't know whether it belongs to this.

**Interviewer:** Mmm...

**Mother:** I don't know a right answer to this.

**Interviewer:** As if, a certain response that you have seen and you could say: Interesting, if it was with me, it would have been different; if it was at home, it would have been something else, another response...

**Mother:** Ah... ah... (quiet)

**Interviewer:** You don't remember. Ok, you don't have to.

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better?

**Mother:** To understand C's behavior? It gave me... It gave me... It's probably important, all the... It really exposed her to the world of sounds, and this is also maybe because she really likes it, because as soon as she got the implant, she 'attached' herself to it, and she likes, she likes... and everything that made sound, she tried to make it.

**Interviewer:** Here you got a reinforcement that she really likes this whole subject of sounds and music. Also at home she is looking for this all the time.

**Mother:** Yes.

**Interviewer:** That also at home she is looking for this all the time.

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Mother:** I don't have these instruments at home. There was a time when I asked Ester<sup>1</sup> if they have similar instruments in the kindergarten- that she will do it there, but it wasn't like that.

**Interviewer:** I see. So you don't feel that it contributed anything to you.

**Mother:** It contributed to the child herself, I see it did.

**Interviewer:** No, but for you, for your work with her, for helping her, or in general, a certain way of thinking that...

**Mother:** Here, for example, the "ba, ba, ba" or that of the car I did repeat with her, because I saw that... She goes back to the car, to the pictures of the car and it helps her to better internalize it.

**Interviewer:** So it's not from observing her specifically but more from what you saw when Dikla was working with her.

**Mother:** I remembered that.

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples?

**Mother:** Sometimes she can also be angry, and sometimes- irritated, but here it was so nice for her, so there was nothing to be angry at (She laughs).

**Interviewer:** You didn't see her "red head" character here...

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<sup>1</sup> Ms. Ester Meir is the principal of "Shemayah".



**Mother:** Ah...

**Interviewer:** So for you it's a sign that she enjoyed the sessions so much that she didn't have a reason to get angry. OK.

**Mother** (speaking simultaneously with the interviewer): She didn't have a reason to get angry.

**Interviewer:** Can you compare your experience during the sessions with what you are experiencing now, as you watch the video segments?

**Mother:** Now I remembered and got excited again, but of course, when it was real, I also enjoyed it. As if... It was also nice for me to watch. It's a nice time that I watch, that thank God that she is progressing, that she starts talking, that she understands what she is told.

**Interviewer:** So to watch it now- was it a good experience compared to the time when you were sitting in the session and watching it?

**Mother:** A renewed experience.

**Interviewer:** Ah, it relived this excitement...

**Interviewer:** Your expectations prior to the start of the research were as follows: "that the girl will enjoy the experiences that she hasn't experienced, for her pleasure" (copied from the questionnaire that was filled out before the research began). According to what you have seen in the videotapes and/or at home, were these expectations fulfilled? Please explain.

**Mother:** I see that she enjoys all the experiences with the music instruments as well as the music. OK, she doesn't have the instruments available for her, and she enjoyed every session. Dikla greatly contributed because she was so nice to her and made her work so nice.

**Interviewer:** How could you see that she enjoyed it very much?

**Mother:** Because she also came happily, she didn't cry. OK, I was with her, it's no big deal. I stayed with her. She enjoyed because she cooperated.

**Interviewer:** Yes, OK.

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Mother:** No, I don't.

**Interviewer:** We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.

## נספח M2

### ראיון לאמה של C

ראיון זה יערך **בנפרד** לך ולבעלך. ראשית, נצפה במשך 10 דקות בקטעי וידאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתפי ככל שתוכלי באשר למה שראית והרגשת ביחס להשתתפות בתך בטיפול במוסיקה. הינך רשאית לומר לי לעצור את הוידאו בכל רגע, במידה ותרצי להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האם:** הקטע הראשון. כי רואים שהיא ממש מדברת. מלים אפילו. תקשורת ממש. זה ברור. הראשון בטח. גם השלישי, הרביעי.

**המראיינת:** שמה היה בהם מרגש?

**האם:** סתם, רואים את כל התקשורת, את ההבנה.

**המראיינת:** את ההתקדמות שלה.

**האם:** כן, כן.

**המראיינת:** איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האם:** לא. את כולם אהבתי. כולם היה יפה.

**המראיינת:** לא היה משהו ספציפי שאולי קצת אכזב, אולי הרגז, אולי היתה לו השפעה יותר שלילית עליך?

**האם:** לא. דקלה מאוד השתדלה באמת להיות נחמדה אליה, ובאמת להוציא את המירב מהילדה.

**המראיינת:** אולי משהו ב-C. אולי שהיה קצת... את לא יכולה להצביע על משהו כזה?

**האם:** אני בכלל, זה לא כל כך חוכמה, כי אני אראה בה טוב.

**המראיינת:** את זה אנחנו כבר יודעים...

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של בתך בביתכם?

**האם:** כן, למשל את ה'בם בם בם' ואת הזה של הרמקול ואת הזה של האוטו ממש היתה אומרת בבית. חוזרת על זה בבית. הייתי מראה לה אוטו והייתי כמובן גם אני חוזרת על זה. הרבה היתה חוזרת על זה בבית שהתרגשתי שזה... את זה אני זוכרת ממש ואולי גם על האלה... שהיא היתה ככה... אין לנו כזה בבית (מתכוונת לטמבורין שהרכיבה על הכתפיים). היתה עושה תנועה כזאת, שהיא מזכירה לי שהיא עשתה. זה היה נחמד כזה.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות/אחרות** של בתך?

**האם:** על אותם דברים? אלה לא היו אותם דברים.

**המראיינת:** או אותם עקרונות אפילו. לאו דווקא בדיוק אותם דברים אבל אותם עקרונות.

**האם:** מה זה אחרת? כמו למשל, הייתי מגיבה אחרת במקום אחר.

**המראיינת:** נכון. אולי הכוונה...

**האם:** בטיפ, למשל, זה אותו הדבר עם הטיפ בבית. היא מנסה להפעיל אותו אבל זה אותו הדבר. אבל משהו לא אותו דבר זה כבר...

**המראיינת:** אולי משהו בחיקוי, בתגובות או בצחוק שלה, שזה לא אותו דבר.

**האם:** אבל זה משהו שונה- אני לא יודעת אם זה שייך לזה.

**המראיינת:** המ...

**האם:** לא יודעת תשובה נכונה לזה.

**המראיינת:** כאילו, איזושהי תגובה שראית והיית יכולה להגיד- מעניין, כאילו אם זה היה אתי, זה היה אחרת, אם זה בבית, זה היה משהו אחר, תגובה אחרת...

**האם:** אה, אה... (שותקת).  
**המראיינת:** לא נזכרת. טוב, לא חייבים.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות בתך טוב יותר?  
**האם:** להבין את ההתנהגות של C? המ... זה נתן לי... זה באמת אולי חשוב. כל ה... זה פתח אותה באמת לעולם של צלילים, וזה, אולי גם מכיוון שהיא כן אוהבת את זה, כי ישר שהיא קיבלה את השתל היא נצמדה והיא אהבה, היא אוהבת... וכל מה שעשה רעש באמת, היא ניסתה לעשות.  
**המראיינת:** יכולת לקבל פה חיזוק יותר לזה שהיא באמת אוהבת את כל הנושא הזה של צלילים ומוסיקה.  
**האם:** כן.  
**המראיינת:** שגם בבית היא מחפשת את זה כל הזמן.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לבתך?  
**האם:** אין לי את הכלים האלה בבית. היתה תקופה שדווקא ביקשתי מאסתר<sup>1</sup> אם יש להם בגן כלים דומים שהיא תעשה את זה בגן, אבל זה לא היה כל כך...  
**המראיינת:** הבנתי. אז את לא רואה שזה תרם משהו לילדה.  
**האם:** זה תרם לילדה עצמה. אני רואה שזה תרם.  
**המראיינת:** לא, אבל לך, לעבודה איתה, לעזרה לה, או באופן כללי איזושהי חשיבה ש...  
**האם:** הנה למשל- הזה של ה"בה בה בה" או של האוטו אז כן חזרתי איתה כי ראיתי שזה... היא חוזרת אל האוטו, אל התמונות של האוטו ומבינה טוב, וזה נכנס לה יותר.  
**המראיינת:** או קיי. אז זה לא מהצפייה באופן ספציפי אלא ממה שראית כשדקלה עבדה איתה.  
**האם:** נזכרתי בזה.

**המראיינת:** האם קיימים איפיונים התנהגותיים של בתך שלא באו לידי ביטוי בקטעי הוידאו שראית?  
**האם:** לפעמים היא גם כועסת ולפעמים היא מתרגזת, אבל כאן היה לה כל כך נחמד, אז לא היה לה בשביל מה להתרגז (צוחקת).  
**המראיינת:** לא כל כך ראית את הג'ינג'יות שלה פה.  
**האם:** אהה...  
**המראיינת:** אז בשבילך זה סימן שהיא כל כך נהנתה אז לא היתה לה סיבה להתרגז. או קיי.  
**האם (אומרת יחד עם המראיינת):** אז לא היתה לה סיבה להתרגז.

**המראיינת:** האם את יכולה להשוות את החוויה שלך בזמן הנוכחות שלך בפגישות עצמן לחוויית הצפייה כעת בקטעי הוידאו?  
**האם:** עכשיו נזכרתי והתרגשתי מחדש, אבל כמובן בזמן שזה היה על-באמת אני גם נהניתי מזה כאילו, זה גם היה נחמד לי לראות. זה שעה כזו נחמדה שאני רואה שברוך השם היא מתקדמת, שהיא מתחילה לדבר, היא מבינה מה שאומרים לה.  
**המראיינת:** אז לצפות עכשיו זו היתה חוויה טובה ביחס למה שישבת וראית אז?  
**האם:** חוויה מחדשת.  
**המראיינת:** אה, זה העלה את ההתרגשות הזו מחדש...

**המראיינת:** ציפיותך מהמחקר לפני תחילתו היו: "שהבת תהנה מהתנסויות שלא התנסתה בהן, להנאתה" (הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר). בהתאם למה שראית במהלך הפגישות וכן כעת בקטעי הוידאו, האם צפיותך התמלאו? אנה הסבירי.  
**האם:** אני רואה שהיא נהנתה מכל החוויות של הכלים ושל המוסיקה. טוב, אין לה את הכלים האלה נגישים כל כך אצלה, והיא נהנתה מכל הפגישה. דקלה תרמה הרבה כי היתה כל כך נחמדה אליה והפעילה אותה כל כך יפה.  
**המראיינת:** איך את יכולה לראות שהיא מאד נהנתה?  
**האם:** כי היא גם באה בשמחה. היא לא בכתה. טוב, אני הייתי איתה, זה לא חכמה שנשארת איתה. היא נהנתה כי... היא שיתפה פעולה.

<sup>1</sup> גב' אסתר מאיר מנהלת את "שמעיה" בבני-ברק.

**המראיינת:** כן, או קיי.

**המראיינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתפי.

**האם:** לא, אין לי.

**המראיינת:** סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.



## Appendix M3

### Interview of Ay's mother

**Interviewer:** This interview will be carried out individually, at different times, with you and your husband. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Mother:** When the magnet of the implant fell down.

**Interviewer:** Why?

**Mother:** It was the first time we have seen that. Ay simply told Dikla "one moment" and she put it back on her head and Dikla continued. Ay told Dikla "one moment" as if she didn't want to miss a moment in life. Ay not only manages in life but she has fun doing it. There was one other segment where she got on in life, but here, it's not only the fact that she is getting along, but she gets along with her handicap. She said "one moment" and she would continue. She wouldn't miss anything because of this handicap.

**Interviewer:** What moment or part of a session did you like the least?

**Mother:** The moment that was a bit difficult for me- OK, maybe it doesn't have anything to do with hearing, but... until she heard... OK, she did hear quickly but until she succeeded functioning... Suddenly, I felt that she was losing an opportunity.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain.

**Mother:** When she played the electric organ, she started from the first key, and she really, how would I say, continued playing up to the last key, as if she has that need to complete it to the very end. She needs... she must do what she does up to the end.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Mother:** Yes.

**Interviewer:** Would you please explain:

**Mother:** The fact that Ay sat with Dikla the way she did and agreed to repeat after her... at home I don't succeed so much. Here I guess she is very focused and she knows that now we sit and... At home I wouldn't succeed so much from the point of view of... as if... because Dikla said to Ay "ah, ah" and she repeated after her. At home I wouldn't succeed doing that. Also the speech therapist has told me to repeat different syllables with Ay, but she wouldn't succeed at home. Words- she did succeed, but not nonsense syllables. Here she did very nicely, what she doesn't want to do at home.

**Interviewer:** The management of this vocalized conversation, with the voices, with the imitation.

**Mother:** Yes, yes. Verbal - That's possible, but vocalized conversation- I wouldn't succeed at home.

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better?

**Mother:** It's very clearly demonstrated that she wanted control over the situation, and Dikla gave it to her very much. If one doesn't give her, then she cannot continue later on, as if... One shouldn't give the girl everything she wants, but in a way, if a person needs very much to control, he should be given an outlet to express that need. Not all the time, but it's good that Dikla gave her to control. Ay presses her, ok, but it's not something terrible. Ay presses, OK, Dikla gives her. One should understand her, and give her what she needs, this control over. I see- it was also in the past and today as well.

**Interviewer:** OK, this belongs to her character.

**Mother:** Yes, that's true. That's part of her character. To give it to her, not all the time, but a lot.

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Mother:** The fact that Dikla gave in the beginning... To tell you the truth, that was all the way through. That Ay will do first. Usually, as a mother, I am the one who decides more what we'll do. OK, now we'll sit down and draw. Or- Let's sit down and you will do, you will be the spinning-top and I... As if to give her the... The truth is that yesterday I did exactly this and I saw- it was really cool. I didn't have the energy to be the one who gives the direction at home. I was sitting on the sofa and doing nothing, and the children directed me and it was very nice. So here I saw it more, that it's possible to do it many times. So it won't be exactly as I want now- we will play exactly what she played in the kindergarten. It can be something that she learned a week ago. That she will be the decision maker, that she will do, she will tell me what to do. Sometimes it happens, but it can develop her much more if I give her now to decide as if it was planned on purpose.

**Interviewer:** Good.

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples?

**Mother:** She is more good-hearted than what was seen here. That she didn't give to Dikla and it's... It's true, that's right, she wants to control over... With a better good-heart she could give Dikla more... or she pushed Dikla because Dikla did before her... So, "go with the flow"... She has... As much as she is a controller, she very much knows to give up and to do things together.

**Interviewer:** Can you compare your experience during the sessions with what you are experiencing now, as you watch the video segments?

**Mother:** When I was sitting in the session for 20 minutes, many times it was boring, because it wasn't so interesting as in here, all the fun of remembering. And to really see the... And how long was it? Five, ten minutes, just to see her strongest things it was very very nice, much more than sitting in the session...

**Interviewer:** ... For a long time.

**Mother:** Yes.

**Interviewer:** Your expectations prior to the start of the research were as follows: "That Ay will like music and will enjoy it" (copied from the questionnaire that was filled out before the research began).

According to what you have seen in the videotapes and/or at home, were these expectations fulfilled? Would you please explain:

**Mother:** There are no... There are no words. It seems to me that... Every little child- What one teaches him, that's what's left for him for the future, and this is something that doesn't... Also if she would have gotten it in an older age, it wouldn't be the same. It's simply... People always say that music for children with hearing impairments is difficult in a way, because let's say that they hear and do not always know to dance according to the rhythm, but here Dikla made Ay learn it... She learned to hear the rhythm precisely... All the little points... All the... In a very exact way. A thing that... It's fantastic how it will add to her life and it's for all her life because it was done in such a young age.

**Interviewer:** How nice!

**Mother:** You know what, I didn't think at all she will get to this. I was told- OK, the hearing impaired, so they don't like music, so I said: ok, so she won't like music, but a child that loves it so much... It doesn't seem normal to me.

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Mother:** Maybe it's a repetition, but I enjoyed it very much the way Dikla,... with all the patience... Maybe it's what I said before, that I didn't succeed to sit with Ay and have a conversation... Because usually I would initiate things at home, not her. And this is... as if... patience. Dikla waits until Ay will do... One can see here- until Ay didn't completely finish, Dikla didn't start. There was one time where Ay said to her: "Not you" but during the process you see that Dikla she waits and allows her to do it. It was superior.

**Interviewer:** Good. Great. We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.





## נספח M4

### ראיון לאמה של Ay

**המראיינת:** ראיון זה יערך **בנפרד** לך ולבעלך. ראשית, נצפה במשך 10 דקות בקטעי וידאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתפי ככל שתוכלי באשר למה שראית והרגשת ביחס להשתתפות בתך בטיפול במוסיקה. הינך רשאית לומר לי לעצור את הוידאו בכל רגע, במידה ותרצי להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האם:** שנפל לה השתל.

**המראיינת:** מדוע?

**האם:** פעם ראשונה ראינו את זה. היא פשוט אמרה לה "רגע" והיא שמה את זה ודקלה המשיכה, אז היא אמרה לה "רגע" כאילו היא לא רוצה להפסיד בחיים. היא לא רק מסתדרת אלא בכיף מסתדרת. היה עוד איזה קטע שהיא הסתדרה בחיים, אבל כאן זה לא רק שהיא מסתדרת בחיים, אלא היא מסתדרת עם המוגבלות שיש לה. אמרה "רגע", והיא תמשיך, היא לא תפסיד בשביל זה.

**המראיינת:** איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האם:** הקטע שהיה לי קצת קשה – טוב, זה אולי לא קשור לשמיעה, אבל... עד שהיא שמעה... טוב, היא כן שמעה מהר אבל עד שהיא הספיקה לתפקד, פתאום... החמצה כזאת.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של בתך בביתכם?

**האם:** שהיא עשתה באורגן, היא התחילה מהתחלה והיא עשתה ממש, איך קוראים לזה, עד הקליד האחרון. כאילו יש לה... שהיא גומרת עד הסוף. היא צריכה... היא צריכה אותו עד הסוף.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות/אחרות** של בתך? אנא הסבירי בבקשה.

**האם:** זה שהיא ישבה איתה ככה והסכימה לחזור אחריה, בבית אני לא כל כך מצליחה. כאן היא כנראה מאוד מרוכזת, והיא יודעת שעכשיו יושבים ו... בבית לא הייתי מצליחה כל כך הרבה מבחינה של... כאילו... כי היא אמרה לה "אה, אה" והיא חזרה אחריה. בבית לא הייתי מצליחה לעשות את זה. גם אורלי היתה אומרת לי לחזור על כל מיני הברות. היא לא היתה מצליחה בבית. מלים כן, אבל לא הברות טפל היא עשתה פה מאוד יפה, מה שבבית היא לא רצתה.

**המראיינת:** כאילו ניהול השיחה הלא-מילולית הזו, עם הקולות, עם החיקוי.

**האם:** כן, כן. מילולי אפשר, אבל לא מילולי לא הייתי מצליחה בבית.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות ילדך טוב יותר? אנא הסבירי בבקשה.

**האם:** מאוד רואים איך שהיא שולטת ודקלה מאוד נתנה לה את זה. אם לא נותנים לה, אז היא לא יכולה אחר כך להמשיך, כאילו... לא צריך לתת לילדה את כל מה שהיא רוצה, אבל באיזשהו מקום, אם בן אדם מאוד שולט, אז צריך לתת לו פורקן למה שהוא רוצה. לא כל הזמן, אבל טוב שהיא נתנה לה. היא לוחצת, בסדר, אבל זה לא משהו נורא. היא לוחצת, בסדר, היא נותנת לה. צריך להבין אותה, לתת לה את שלה במה שהיא צריכה, השליטה הזאת. אני רואה- גם אז וגם עד היום.

**המראיינת:** טוב, זה קשור לאופי.

**האם:** כן, נכון. זה הקטע שלה באופי שלה. לתת לה את זה, לא כל הזמן אבל הרבה.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לילדך?

**האם:** זה שהיא נתנה בהתחלה... האמת, זה לכל אורך הדרך. שהיא תעשה ראשונה. בדרך כלל בתור אמא אני יותר מחליטה מה נעשה. טוב, עכשיו בוא נשב ונצייר. או בוא נשב ואת תעשי, את תהיי הסביבון ואני... כאילו לתת לה את ה... האמת שאתמול בדיוק עשיתי את זה וראיתי- זה היה ממש נחמד. לא היה לי כוח להיות המכוונת בבית. ישבתי על הספה ולא עשיתי כלום, והם כווננו אותי והיה מאוד נחמד. אז פה אני ראיתי את זה יותר שאפשר הרבה פעמים לעשות את זה. אז לא יהיה בדיוק מה שאני רוצה עכשיו- נשחק מה שבדיוק היא למדה היום בגן. יכול להיות מה שהיא למדה לפני שבוע. שהיא תהיה המחליטה, שהיא תעשה, שהיא תגיד לי מה לעשות. לפעמים זה קורה, אבל שכאילו זה יהיה במכוון שאני נותנת לה עכשיו שהיא תחליט. זה יכול הרבה יותר לפתח. באמת, אפילו... זה לא קשור לפה אבל אפילו על אחותה, שבוא נאמר, היא פחות שתלטנית, Ay, איך את אומרת, גם אם אני לא נותנת לה היא עושה את זה אבל אם כל זה תתני לה את זה באמת. כאילו עכשיו את המחליטה, לא בטעות כאילו את התחלת... כאילו זה הזמן שלך. את עושה ואני יושבת ו...  
**המראיינת:** טוב.

**המראיינת:** האם קיימים איפיונים התנהגותיים של ילדך שלא באו לידי ביטוי בקטעי הוידאו שראית?  
**האם:** זה שכאילו... יש לה לב יותר טוב ממה שהיה פה. שהיא לא נתנה לדקלה וזה... בסדר, נכון, היא רוצה להשתלט... היא יכולה עם קצת יותר לב טוב לתת לדקלה יותר ל... או שהיא דחפה אותה כי היא עשתה לפני... נו יאללה, תזרמי, תעבירי... יש לה... כמה שהיא שתלטנית, היא מאוד מאוד יפה יודעת לוותר ולשתף ולעשות ביחד.

**המראיינת:** האם את יכולה להשוות את החוויה שלך בזמן הנוכחות שלך בפגישות לחוויית הצפייה כעת בקטעי הוידאו?  
**האם:** שישבתי 20 דקות, היה הרבה פעמים משעמם כי זה לא היה כל כך מעניין כמו פה. כל הכיף של להיזכר. ובאמת לראות את ה... וכמה זמן זה היה? חמש, עשר דקות, ככה לראות את כל הדברים הכי הכי חזקים שלה זה היה מאוד מאוד יפה, הרבה יותר מאשר לשבת...  
**המראיינת:** ... לאורך זמן.  
**האם:** כן.

**המראיינת:** ציפיותיך מהמחקר לפני תחילתו היו: "שאילה תאהב מוסיקה ותינה מזה". (הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר). בהתאם למה שראית במהלך הפגישות וכן כעת בקטעי הוידאו, האם צפיותיך התמלאו? אנא הסבירי.  
**האם:** אין, אין לי מלים. זה נראה לי ש... כל ילד קטן מה שמלמדים אותו זה מה שנשאר לו לעתיד, וזה דבר שלא ... גם אם היו עושים לה את זה בגיל יותר מבוגר, זה לא היה זה. זה לא היה זה. זה פשוט... תמיד אומרים שמוסיקה לילדים לקווי שמיעה זה קשה בצורה מסוימת כי בואי נגיד, שומעים ולא תמיד יודעים לרקוד לפי הקצב, אבל כאן היא הכניסה לה את זה, היא למדה את הקצב לשמוע ובדיוק... את כל הנקודות הכי קטנות... כל ה... כאילו מאוד בצורה מדויקת. דבר ש... לא נורמאלי איך שזה יוסיף לה, וזה לכל החיים בגלל שזה היה בגיל כזה צעיר.  
**המראיינת:** איזה יופי.

**האם:** את יודעת מה, אני לא חשבתי שהיא תגיע לזה בכלל. אמרו לי- טוב, לקווי שמיעה, אז הם לא אוהבים מוסיקה, אז אמרתי- טוב, אז היא לא תאהב מוסיקה. אבל ילדה שכל כך אוהבת... זה לא נראה לי נורמאלי.  
**המראיינת:** נפלא.

**המראיינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתפי.  
**האם:** אולי זה שוב חזרה אבל אני מאוד נהניתי איך שהיא... כאילו עם כל הסבלנות...אולי זה מה שאמרתי קודם שאני לא הצלחתי בבית לשבת איתה מולה ולנהל שיחה או שאמרתי שאני לא...כי בדרך כלל אני הייתי יוזמת דברים בבית ולא היא. וזה לחיוב, זה לא לתיקון... כאילו... סבלנות היא מחכה עד שהיא תעשה... רואים פה למשל- עד שהיא לא גמרה ממש, היא לא התחילה. דקלה לא התחילה. היתה פעם אחת ש-Ay אמרה לה "לא את" אבל ממש בתהליך את רואה שהיא מחכה ונותנת לה לעשות את זה. זה היה מעולה.

**המראיינת:** טוב, יופי. סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.

## Appendix M5

### Interview of Ay's father

**Interviewer:** This interview will be carried out individually, at different times, with you and your wife. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Father:** The moment where she tells Dikla what to do. When she says: "I am against"...

**Interviewer:** Can you explain why this moment was especially so exciting for you?

**Father:** It's good when every person insists on his opinion. Of course she imitated Dikla, so it's important that she can insist on her opinion.

**Interviewer:** What moment or part of a session did you like the least?

**Father:** There is nothing special.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home?

**Father:** I remember that at the time Dikla was working with her, suddenly at home she took notice of different kinds of sounds and this was due to the fact that Dikla worked with her on that.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Father:** I don't remember anything specific.

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better?

**Father:** I know her so well. I don't know about something specific.

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Father:** Maybe if I had seen this a while ago, it would have helped me. But now I can see that she integrates everything, so I don't have anything specific to work on with her right now.

**Interviewer:** So it's not relevant.

**Father:** It's not relevant.

**Interviewer:** And what's then? On what specific kind of work you would say- I would have done this at home with her.

**Father:** All sounds. To work with her as we did, but yet, here I saw things that she paid more attention to, such as the dog, the tape recorder, those kinds of things.

**Interviewer:** The recognition of sounds.

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples?

**Father:** I didn't see anything special.

**Interviewer:** Your expectations prior to the research were as follows: "We would like her to enjoy the research as well as listen to all the sounds of music, and that she would tell us what tape or what kind of music she wants". According to what you have seen in the videotapes and/or at home, were these expectations fulfilled?

**Father:** These days she is listening to everything. She still doesn't say what tape or something because she doesn't understand it, but the idea that she responds to every sound, everything... We even heard an alarm of a car, and she called me "come, come, come" and pointed to her ear. That means that she perceives, that she knows that sound is something she should show she hears it.

**Interviewer:** So it's the part of listening and being aware of sounds.

**Father:** Yes.

**Interviewer:** Those expectations were fulfilled. Good.

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Father:** No, only the fact that we enjoyed it very much.

**Interviewer:** We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.

## נספח M6

### ראיון לאביה של Ay

ראיון זה יערך **בנפרד** לך ולאשתך. ראשית, נצפה במשך 10 דקות בקטעי וידיאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתף ככל שתוכל באשר למה שראית והרגשת ביחס להשתתפות בתך בטיפול במוסיקה. הינך רשאי לומר לי לעצור את הוידאו בכל רגע, במידה ותרצה להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האב:** הקטע שהיא 'תופסת גב'. שהיא אומרת לדקלה מה לעשות. שהיא אומרת: "אני עכשיו נגד".

**המראיינת:** אתה יכול להסביר למה זה דווקא מרגש אותך באופן מיוחד?

**האב:** לכל בן אדם טוב שיש גב. כמוכן שהיא עשתה כמוה, אז זה דבר חשוב שיהיה לה גב.

**המראיינת:** איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האב:** אין משהו מיוחד.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של בתך בביתכם? אנא הסבר בבקשה.

**האב:** אני זוכר באותה תקופה שהיא היתה עובדת איתה, פתאום היא היתה קולטת כל מיני צלילים, וכנראה שזה בזכות זה שהיא עבדה איתה על זה.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות/אחרות** של בתך? אנא הסבר בבקשה.

**האב:** לא זכור לי משהו.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות בתך טוב יותר? אנא הסבר בבקשה.

**האב:** אני מכיר אותה כל כך טוב. כאילו, אני לא יודע על משהו מיוחד.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לבתך? אנא הסבר בבקשה.

**האב:** יכול להיות שאם הייתי רואה את זה אז, זה היה יותר עוזר לי אז. כיום אבל אני רואה שהיא כל כך משתלבת בכל צליל, בכל דבר, אז אין לי משהו כיום לעבוד איתה יותר.

**המראיינת:** שזה לא רלוונטי.

**האב:** שזה לא רלוונטי.

**המראיינת:** ומה אז? איזה צורת עבודה ככה אתה היית אומר: הייתי עושה איתה בבית?

**האב:** כל הצלילים. לעבוד איתה. כמה שעבדנו, אבל בכל זאת, כאן ראיתי דברים יותר שהיא היתה שמה לב, כמו עם הכלב, עם הטייפ, את הדברים האלה.

**המראיינת:** הזיהוי של הצלילים.

**המראיינת:** האם קיימים אפיונים התנהגותיים של בתך שלא באו לידי ביטוי בקטעי הוידאו שראית?

אנא תן מספר דוגמאות.

**האב:** לא ראיתי משהו.

**המראיינת:** ציפיותיך מהמחקר לפני תחילתו היו: "שהיא תמשיך ליהנות במחקר ושעל ידי המחקר תאזין לכל קולות המוסיקה ותאמר לנו איזה קסטה או איזה סוג מוסיקה היא רוצה..." (הקטע הועתק מתוך

השאלון שמולא על ידך לפני תחילת המחקר). בהתאם למה שראית בקטעי הוידאו ו/או בבית, האם צפיתך התמלאו? אנא הסבר.

**האב:** היא היום מקשיבה לכל דבר, היא עוד לא אומרת איזה קסטה או משהו כזה, כי היא לא מבינה את זה, אבל הרעיון שהיא מגיבה לכל צליל, כל דבר, כל שמיעה. אפילו היתה לנו ברחוב אזעקה מאיזה רכב, היא קוראת לי: "בוא, בוא, בוא" ומצביעה לי על האוזן. זאת אומרת שהיא קולטת, שהיא יודעת שצליל זה דבר שצריך להראות ששומעים את זה.

**המראינת:** אז החלק הזה של ההאזנה ושל המודעות לצלילים.

**האב:** כן.

**המראינת:** הציפיות האלה התממשו. טוב.

**המראינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתף.

**האב:** לא, שמאוד נהנינו.

**המראינת:** סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.

## Appendix M7

### Interview of Af's mother

**Interviewer:** This interview will be carried out individually, at different times, with you and your husband. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Mother:** The part with the cymbal. There was something about the way he is, that he goes along with all his strength. This is Af, in this part.

**Interviewer:** Nice.

**Interviewer:** What moment or part of a session did you like the least?

**Mother:** Several parts – when he less went along with things. The sixth session, when he made this sound with his voice, was nice, but he was less himself, he was more passive.

**Interviewer:** Yes? You felt it was not really him?

**Mother:** Yes

**Interviewer:** OK

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain

**Mother:** Yes, yes, a lot. With all the video clips. We also have at home music instruments, not real ones but still, he seemed to like them very much. I told Dikla, if she could see the questionnaire she gave us at the beginning and the one now – they are totally opposite. Now he constantly seeks to knock on walls, on doorframes, just to hear the sounds. And you see it on the cymbal, the soft, the loud. And the bells, he just loves it. To participate, to take... to be in control of everything. It was very much ...

**Interviewer:** It was similar.

**Mother:** Indeed, similar.

**Interviewer:** Good.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Mother:** Perhaps the fact that there was less voice production in these clips. Sometimes because his sister is around and she loves singing, so maybe he likes also at home to vocalize more. Here he used his voice less except for the 6<sup>th</sup> video segment but still I missed hearing him more. He always shouts and makes more sounds.

**Interviewer:** Much more vocal.



**Mother:** Yes.

**Interviewer:** OK.

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better?

**Mother:** It didn't make me understand his behavior better, since I know very well his behavior. If there is a child I know well, it is my son. I know very well his independence and his... he knows how to take control of things sometimes. Really. Everything. But it made me see how much he likes playing instruments and how much I would like to invest in this area of playing for him, buy him more instruments, more serious, so that he enjoys it more, because I see he enjoys the drums particularly. Really. The son of our neighbor across the way has a set of drums. Every time Af goes there, he sits on the chair and starts playing. He gets very enthusiastic about it, and I would love it. But knowing my child...

**Interviewer:** You didn't get much new information.

**Interviewer:** Not much.

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Mother:** Yes, of course. Really. More about the topic of... to get to... play myself and then he will do it too. It worked better with him this music thing because he connects to music better. At home too I see he is constantly looking where to hear sounds from. He even throws things, tosses them, just to hear the sounds. It gave me new ways about how to play more with him, how to get him more involved, although we do play with him a lot, but it is still a pleasure to see him.

**Interviewer:** Good, very nice.

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples?

**Mother:** I expected him more to take over, because usually when there are things he likes he wants to have control. "I am here and I decide", like with the cymbal, I saw that he was enjoying it so he took over and said: it will be like this. Although he did participate with Dikla but he took over more. With the songs too, he showed himself, his presence, "this song yes and that song no". The part that was less – with the electronic organ, I don't know, he was involved, not involved. Well, you see, it depends also sometimes on how he got up in the morning, how he behaves on the same day, it changes sometimes. One day I was here with him, I got here with him in the morning, and he knew it and you could see that he was...

**Interviewer:** Less involved.

**Mother:** Less involved, and one day that someone other than Av went upstairs with him, he didn't participate at all because the woman didn't want to go upstairs. She said immediately "I don't feel like this and I don't feel like that" and he has a feel for behaviors. He is the kind of person that knows immediately – this one likes me, that one doesn't, and he saw immediately that she didn't feel like it so he didn't participate at all. He was sitting there watching... toward the end really at the end, and I came on purpose to see it - only at the end he participated a bit, because it was again with the cymbal, but otherwise – he really didn't participate. It was not at all Af. It was really... on that day I got a shock. That's it.

**Interviewer:** But you say that in the video clips that you have seen, you expected him to take more control, that he will try to control things constantly.

**Mother:** Yes, but again- I see that when he likes something, he takes control, but from the rest of the things he stays a bit distant. But it is ok, he is still... hmmm...

**Interviewer:** OK

**Interviewer:** Your expectations prior to the start of the research were as follows: "I hope that the research will encourage him to listen to music, that it will contribute to his hearing and will present him with different timbres of music" (copied from the questionnaire that was filled out before the research began). You then wrote: "It's true that he is now little". According to what you have seen in the videotapes, were these expectations fulfilled?

**Mother:** I would say many of them got fulfilled, first because he loves music very much more than at the beginning. You can see the difference between what I wrote down now and at the beginning; it is very different. I see that he is closer to music; he is more interested in listening. He also... look, he also grew up and with the implant his hearing gets constantly better, so he more *wants* to speak. Here it disturbed me that there was very little talking, but now at home he wants more this disk and not that one. Also songs I sing to him, there are some songs he likes better and some less. More than before, beforehand there were times that he didn't want songs at all since he didn't hear them well. I thought he didn't want them because he was hearing them in the kindergarten all day long, but today that he hears better and has done this whole process with Dikla, I... He wants very much to hear more, more songs. He takes the microphone, and in the past he used to be afraid of hearing himself on the loudspeaker and he really refused to do it, he was really reluctant and today he really wants. He does constantly "la la la" like in the song where she does "la la la" just like this, really.

**Interviewer:** Nice, very nice.

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Mother:** About what?

**Interviewer:** About everything he went through, the process, the research.

**Mother:** I think what I talked about with Dikla and what I know about my son, that he received also hours of music and hours of play, and I am sure and I know that he likes music more, because play he plays all the time, it is not something that is so new to him, since at home we also play a lot. We also give him more music, but here it is more professional and there are more real instruments like those of adults, so he also understands that it's not a toy, and at home the instruments are very colorful and here they look more like the real thing, and you can see that he gets more enjoyment from playing the music and listening. Really, it was fun to see this.

**Interviewer:** Nice, very nice.

**Mother:** I just want to add something. Really, sincerely, anything that I am told might be good for the child, I agree to it immediately. Kind of – I don't mind. My husband is more reluctant. He says: what does it help? But really, no doubt about it, I think this gave us a lot. Anything more that he gets- is excellent, because anything that is for him- is joy for me, because it is a pleasure to see him changing and speaking at all.

**Interviewer:** Yes, how nice. Good. I wish you to go on, to continue enjoying him. Very nice. Thank you.

**Mother:** You're welcome.

**Interviewer:** We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.



## נספח M8

### ראיון לאמו של Af

ראיון זה יערך **בנפרד** לך ולבעלך. ראשית, נצפה במשך 10 דקות בקטעי וידאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתפי ככל שתוכלי באשר למה שראית והרגשת ביחס להשתתפות בנך/בתך בטיפול במוסיקה. הינך רשאית לומר לי לעצור את הוידאו בכל רגע, במידה ותרצי להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האם:** הקטע עם המצילה. היה בזה משהו באופי שלו שהוא עם כל הכוח הוא משתלב. זה אסף, בקטע הזה. **המראיינת:** אהה. יפה.

**המראיינת:** איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האם:** כמה קטעים- שהוא פחות משתלב. אני חושבת... הקטע השישי, זה שהוא השמיע את הקול זה היה נחמד, אבל הוא פחות הראה את עצמו, הוא היה יותר פאסיבי כזה.

**המראיינת:** כן? הרגשת שזה לא הוא ממש?

**האם:** כן.

**המראיינת:** טוב.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של ילדך בביתכם?

**האם:** כן, כן. המון. בכל הקטעים. גם אצלנו בבית יש כלי נגינה לא אמיתיים אבל עדיין, הוא נורא התחבר אליהם. אמרתי לדקלה- אם היא הייתה רואה את השאלון שהיא נתנה בהתחלה ועכשיו- זה שמים וארץ. עכשיו הוא מחפש כל הזמן לדפוק על הקירות, על המשקופים, רק בשביל לשמוע את הצלילים ורואים את זה גם במצילה, את החזק, חלש. את הפעמונים הוא נורא אוהב. לשתף, לקחת... להשתלט על הכל. זה מאוד היה...

**המראיינת:** היה דומה.

**האם:** ממש דומה.

**המראיינת:** יפה.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות/אחרות** של ילדך?

**האם:** אולי שהיה פחות הפקה קולית. שלפעמים בגלל שאחותו נמצאת והיא המון אוהבת לשיר אז כנראה הוא אוהב גם בבית יותר להשמיע את הקול. פה פחות הוא השמיע את הקול שלו חוץ ממה שהיה בקטע השישי אבל עדיין חסר לי לשמוע אותו יותר. תמיד הוא צועק ומשמיע יותר.

**המראיינת:** הרבה יותר קולי.

**האם:** כן.

**המראיינת:** או קיי.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות ילדך טוב יותר? אנא הסבירי בבקשה.

**האם:** זה לא גרם לי להבין את ההתנהגות שלו כי אני מאוד יודעת מה ההתנהגות שלו. אם יש ילד שאני יודעת- זה הבן שלי. אני ממש מכירה את העצמאות שלו. את ה... הוא יודע להשתלט לפעמים. ממש. הכל. אבל זה גרם לי לראות כמה הוא אוהב את הנגינה יותר וכמה הייתי רוצה להשקיע לו יותר בקטע של הנגינה, לקנות לו את כל הכלים, יותר רציני בשביל שיהנה גם, כי אני רואה כמה הוא נהנה במיוחד מהתופים. באמת. לשכנה שלנו ממול יש מערכת תופים לבן שלה. כל פעם הוא נכנס, יושב על הכסא ומתחיל לנגן. הוא מתלהב מזה מאוד אז מאוד הייתי רוצה. אבל מבחינת להכיר את הילד...

**המראיינת:** לא חידשו לך.

**האם:** לא הרבה.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לילדך?  
**האם:** כן, ברור. ממש. יותר בעניין של ה... לגרום לו כאילו... לנגן אני ואז שהוא יעשה אותו דבר. זה עבד אצלו יותר העניין של המוסיקה כי הוא ממש מתחבר לזה. גם בבית אני רואה הוא כל הזמן מחפש איפה לשמוע צלילים. אפילו לשבור דברים בשביל לשמוע את הצליל. הוא כל הזמן מעיף דברים, זורק, רק בשביל לשמוע את הצליל. אז זה נתן לי איך יותר לשחק איתו, איך יותר לשחק אותו, למרות שאנחנו משחקים איתו המון, אבל עדיין זה כיף לראות אותו.  
**המראיינת:** טוב, יפה.

**המראיינת:** האם קיימים איפיונים התנהגותיים של ילדך שלא באו לידי ביטוי בקטעי הוידאו שראית?  
**האם:** הייתי מצפה לראות שהוא יותר משתלט, כי הוא בדרך כלל, אם יש דברים שהוא מתחבר אליהם אז הוא לוקח פיקוד. אני פה נמצא ואני מחליט, כמו העניין עם המצילה, אז ראיתי שהוא אוהב את זה נורא, אז הוא לקח את הפיקוד על זה והוא אמר- ככה זה יהיה. למרות שהוא השתתף עם דקלה אבל יותר לקח פיקוד על זה. הקטע עם השירים גם- הוא הראה את עצמו, את הנוכחות שלו, "את השיר הזה, לא את השיר הזה". הקטע שהכי היה פחות- האורגן הזה, לא יודעת, הוא כזה שיתף, לא שיתף. טוב, תראי, זה לפעמים תלוי גם באיך הוא קם בבוקר, איך ההתנהגות שלו באותו יום, אז זה לפעמים משתנה, כי יום אחד אני הייתי פה איתו, באיתי איתו בבוקר, הוא ידע שאני נמצאת ואז ראו שהוא...  
**המראיינת:** פחות משתף

**האם:** פחות משתף, וגם פעם אחת שעלתה איתו משהי שהיא לא אביבה, בכלל הוא לא שיתף פעולה כי האישה מראש לא רצתה לעלות. היא מראש אמרה "לא בא לי ולא זה", והוא קולט התנהגויות. הוא בן-אדם שהוא יודע ישר- בן אדם אוהב אותי, לא אוהב אותי, הוא ישר יודע את זה, והוא ראה שלא מתחשק לה ואז באמת הוא לא תפקד בכלל. ממש. הוא ישב ככה וכל רגע הוא הסתכל... ואז לקראת ממש לקראת הסוף, ואני באתי במיוחד לראות ורק לקראת הסוף אולי הוא השתתף קצת כי היה את המצילה שוב, אבל אם לא- הוא ממש לא שיתף פעולה. זה היה ממש לא אסף. ממש זה היה... באותו יום אני קיבלתי שוק כזה. זהו.

**המראיינת:** אבל את אומרת שבקטעים שצפית סך הכל ציפית שהוא ייקח יותר שליטה, שהוא יותר ינסה לשלוט בעניינים כל הזמן.

**האם:** כן, אבל זה שוב פעם- אני רואה שמה שהוא אוהב הוא כן לוקח שליטה אבל משאר הדברים הוא קצת מתרחק, אז זה בסדר, הוא עדיין אה...  
**המראיינת:** או קיי.

**המראיינת:** ציפיותך מהמחקר לפני תחילתו היו: "אני מקווה שהמחקר יעודד אותו לשמוע מוסיקה, שיתרום לו לשמיעה ולהציג לו גוונים שונים של המוסיקה. שיידע לכוון אותנו להעדפות שלו במוסיקה" (הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר), וסייגת את זה, אמרת- "נכון שכרגע הוא קטן", אבל זה מה שהייתי רוצה. בהתאם למה שראית במהלך הפגישות וכן כעת בקטעי הוידאו, האם צפיותך התמלאו? אנה הסבירי.

**האם:** הייתי אומרת שהרבה מהן התמלאו כי קודם כל הוא מאוד אוהב יותר מוסיקה מאשר בהתחלה. רואים את ההבדל בין מה שרשמתי עכשיו להתחלה זה ממש הבדל. ואני רואה שהוא יותר מתחבר למוסיקה, יותר מעניין אותו לשמוע. הוא גם אה... תראי, הוא גם גדל וגם עם השתל הרמה שלו גודלת כל פעם, אז הוא גם רוצה יותר לדבר. פה הפריע לי שלא היה דיבור יותר אבל גם בבית עכשיו הוא כן רוצה יותר את הדיסק הזה ולא את הדיסק הזה. גם שירים שאני שרה לו- שירי ילדים, אז יש שיר שהוא מעדיף יותר ושיר שלא. יותר מאשר פעם כי פעם הוא לפעמים בכלל לא היה רוצה לשמוע את השירים כי הוא לא היה שומע מספיק טוב, ואז חשבתי שזה בגלל שהוא שומע אותם כל היום בגן, אבל היום שהוא כבר שומע יותר טוב וגם עבר עם דקלה את כל העניין, אני... הוא מאוד רוצה יותר לשמוע, יותר שירים. הוא לוקח רמקול ופעם הוא היה מפחד לשמוע את עצמו ברמקול והוא היה ממש לא מוכן, ממש נרתע והיום הוא ממש רוצה. הוא עושה כל הזמן "לה, לה, לה" כמו השיר בהתחלה שהיא עושה "לה, לה, לה" אז ככה, ממש.

**המראיינת:** יפה, נחמד.

**המראיינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתפי:

**האם:** בנוגע למה?

**המראיינת:** בנוגע לכל מה שהוא עבר, לתהליך, למחקר.

**האם:** אני חושבת שמה שדיברתי עם דקלה ומה שאני יודעת על הבן שלי שנתנו לו גם שעות משחק וגם שעות של מוסיקה, ואני בטוחה ואני יודעת שהוא אהב יותר את המוסיקה, כי משחק הוא משחק כל הזמן, זה לא משהו שהוא חדש לו כל כך, כי גם בבית אנחנו המון משחקים איתו. גם מוסיקה אנחנו נותנים לו יותר אבל פה שזה יותר מקצועי ויותר כלים אמיתיים כמו של גדולים, אז גם הוא מבין שזה לא משחק, כי בבית הכלים הם צבעוניים ופה הוא רואה שהם יותר אמיתיים, אז רואים שהוא יותר נהנה מהעניין של הנגינה והשמיעה. ממש, זה היה כיף לראות את זה.

**המראיינת:** יופי. נהדר.

**האם:** רק להוסיף משהו: באמת, אני, את האמת, כל דבר שאומרים על הבן שלי כאילו לעשות לילד, אם זה יעזור לו- אני ישר מסכימה. כאילו לא אכפת לי. בעלי קצת נרתע מזה. הוא אמר- בשביל מה וזה... אבל באמת, אין מה לדבר, אני חושבת שזה תרם לנו המון. שעוד משהו בשבילו זה מצוין, כי כל מה שבשבילו זה שמחה בשבילי, כי זה כיף לראות אותו משתנה ומדבר בכלל.

**המראיינת:** כן, איזה יופי. טוב. אני מאחלת לך שתמשיכי, תמשיכו ליהנות ממנו. יופי. תודה.

**האם:** בבקשה.

**המראיינת:** סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.



## Appedix M9

### Interview of Af's father

**Interviewer:** This interview will be carried out individually, at different times, with you and your wife. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Father:** The most thrilling was the part with the drums. The third part.

**Interviewer:** Can you explain why this part was thrilling to you?

**Father:** When one presents him with an initial challenge he jumps right in and immediately tries to cope with it and one could see it there. This, I know, characterizes me.

**Interviewer:** Yes?

**Father:** Yes

**Interviewer:** OK, nice.

**Interviewer:** What moment or part of a session did you like the least?

**Father:** I think – the 6th part. In the 6th part I could see that he was kind of unclear about what he wanted to do. He was not... He was not focused on anything.

**Interviewer:** You saw that he was less involved, less focused?

**Father:** Less focused

**Interviewer:** OK

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain

**Father:** Yes...

**Interviewer:** Can you give an example, some details?

**Father:** For instance, we read a story or a book to him, like the first part where you see that she sings and he knows about the song, so it is the same with books I read to him – he knows every book, everything precisely. It is the same thing.

**Interviewer:** Such as pointing to the pictures at the right moment according to the story?

**Father:** Yes.

**Interviewer:** OK

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Father:** Depends. Yes, he does. Yes, there is – he was quiet, at home he is a demon.

**Interviewer:** You mean- kind of more disciplined, more attentive?



**Father:** More attentive, yes, much more attentive.

**Interviewer:** OK.

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better? Please explain

**Father:** I don't know. Everything you invest in – it can be good for him. It can be... I don't know, like you saw with the drums. He looked kind of ... involved.

**Interviewer:** Enthusiastic

**Father:** Mmm...

**Interviewer:** Good

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Father:** To tell you the truth... No. this is my wife's task.

**Interviewer:** OK. Her task and her responsibility, you say?

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples? Please give examples

**Father:** At home, you play with him some game or something, he finds more sounds, more sounds.

**Interviewer:** Yes?

**Father:** And here he is kind of quiet.

**Interviewer:** He was more quiet.

**Father:** Yes, much more quiet. This week he took a microphone and started to sing. Really, he started to shout.

**Interviewer:** Make a show?

**Father:** Precisely.

**Interviewer:** Yes? Good, OK

**Interviewer:** Your expectations prior to the start of the research were as follows: "That the research would help him discern sounds and that he would have his preferences in music" (copied from the questionnaire that was filled out before the research began). According to what you have seen in the videotapes and/or at home, were these expectations fulfilled?

**Father:** I feel that part of my expectations have been fulfilled but still it is something he has to work on.

**Interviewer:** Which part? Could you say, out of all your expectations?

**Father:** I feel he discerns but it is not... he needs to work more on it. It is not something that he has fully mastered.

**Interviewer:** I understand. OK

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Father:** What I want to say is that we will try... I, at least, will try to make more sounds for him and I will try to see if he, like he did in the video clips, gets more interested and is more quiet and really listens.

**Interviewer:** What you are actually saying is – It brought to my awareness the importance of making him listen to different kinds of sounds.

**Father:** I am sure... 100% sure that it is important.

**Interviewer:** good, OK. Thank you. We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.



## נספח M10

### ראיון לאביו של Af

**המראיינת:** ראיון זה יערך **בנפרד** לך ולאשתך. ראשית, נצפה במשך 10 דקות בקטעי וידיאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתף ככל שתוכל באשר למה שראית והרגשת ביחס להשתתפות בנך בטיפול במוסיקה. הינך רשאי לומר לי לעצור את הוידאו בכל רגע, במידה ותרצה להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האב:** הכי מרגש זה הקטע עם התופים. קטע מס' 3.

**המראיינת:** אתה יכול להסביר למה זה דווקא מרגש אותך באופן מיוחד?

**האב:** כשמתחילים איתו בנמוך או מעלים את הרף הוא ישר הראשון שקופץ על זה וראו את זה שם. זה, אני יודע, מאפיין אותי.

**המראיינת:** כן?

**האב:** כן.

**המראיינת:** או קיי. יפה.

**המראיינת:** איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האב:** אני חושב - הקטע השישי. בקטע השישי ראיתי שהוא רך כזה, הוא לא, הוא לא התמקד על משהו.

**המראיינת:** שראית את Af פחות מרוכז, פחות ממוקד?

**האב:** פחות ממוקד.

**המראיינת:** או קיי.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של בנך בביתכם?

**האב:** כן.

**המראיינת:** אתה יכול לתת איזו דוגמה, לפרט?

**האב:** דוגמה: שאנחנו מקריאים לו סיפור או ספר כמו בחלק הראשון שהראו אותה שהיא שרה והוא ידע על איזה שיר, אז אותו דבר בספרים שאני מקריא לו- הוא יודע איזה ספר כל דבר בדיוק. זה אותו דבר.

**המראיינת:** ככה מתי להצביע על תמונות לפי הסיפור?

**האב:** כן.

**המראיינת:** או קיי.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות/אחרות** של בנך?

**האב:** זה תלוי. כן, יש לו. כן יש- הוא פה היה רגוע. בבית הוא שד.

**המראיינת:** מה, כאילו גם קצת יותר ממושמע, יותר מקשיב?

**האב:** יותר מקשיב, כן, הרבה יותר מקשיב.

**המראיינת:** או קיי.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות בנך טוב יותר? אנא הסבר בבקשה:

**האב:** לא יודע. שכל דבר שמשקיעים בו- זה יכול לצאת טוב ממנו. זה יכול להיות... לא יודע, כמו שראית עם התופים. הוא נראה כזה... בעניין.

**המראיינת:** מתלהב.

**האב:** מממ... (מהנהן).

**המראיינת:** טוב.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לבנך?  
**האב:** האמת לא, זה התפקיד של אשתי.  
**המראיינת:** או קיי. התפקיד שלה והאחריות שלה, אתה אומר.

**המראיינת:** האם קיימים איפיונים התנהגותיים של ילדך שלא באו לידי ביטוי בקטעי הוידאו שראית?  
 אנא תן מספר דוגמאות.  
**האב:** בבית, שעושים לו משחק או משהו, הוא מוציא יותר קולות, הרבה יותר קולות.  
**המראיינת:** כן?  
**האב:** ופה הוא רגוע כזה.  
**המראיינת:** הוא היה יותר שקט?  
**האב:** כן, הרבה יותר שקט. השבוע הוא לקח רמקול והתחיל כמו לשיר. ממש. התחיל לצעוק.  
**המראיינת:** לעשות הצגה?  
**האב:** ממש.  
**המראיינת:** כן? טוב, או קיי.

**המראיינת:** ציפיותך מהמחקר לפני תחילתו היו: "שהמחקר יעזור לו להבחין בין צלילים ושיהיו לו העדפות במוסיקה". (הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר). בהתאם למה שראית בקטעי הוידאו ו/או בבית, האם צפיותך התמלאו?  
**האב:** אני מרגיש שחלק מהציפיות התמלאו אבל זה עדיין משהו שהוא צריך לעבוד עליו.  
**המראיינת:** איזה חלק? אתה יודע לומר, מתוך כל הציפיות?  
**האב:** אני מרגיש שהוא מבחין אבל זה לא... הוא צריך עוד לעבוד על זה. זה לא משהו שהוא מימש אותו עד הסוף.  
**המראיינת:** הבנתי. או קיי.

**המראיינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתף:  
**האב:** מה שאני רוצה להגיד זה שאנחנו ננסה... אני, בכל אופן, אנסה להשמיע לו צלילים ואני אנסה לראות אם הוא, כמו בקטעים, מתעניין וככה רגוע וממש מקשיב.  
**המראיינת:** אתה בעצם אומר- זה הביא לי למודעות שכנראה יש חשיבות להשמעה של כל מיני צלילים.  
**האב:** יש. אני בטוח 100 אחוז שיש.  
**המראיינת:** טוב, או קיי. סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.

## Appendix M11

### Interview of O's mother

**Interviewer:** This interview will be carried out individually, at different times, with you and your husband. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Mother:** First of all- to see her. And the truth is that all the video clips are beautiful for me as mother, but the moment I loved the most was the first one. I have no idea why, but it's the first one. I don't know... the connection of...that she understood and connected among all the things around. This video clip reminds me of things she is doing at home. The first clip I loved very, very much.

**Interviewer:** What moment or part of a session did you like the least?

**Mother:** Yes. The fourth clip. I don't know... the least... Also the second clip. I didn't really like to watch it the second time. I would just skip that.

**Interviewer:** Ok. Good. Can you say why?

**Mother:** Because it seemed to me meaningless. I don't know. It seemed to me a meaningless clip. She imitates her voice. Something without... I don't know, just like that.

**Interviewer:** Good, ok.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain.

**Mother:** Yes, sure. First of all, the visual aspect- she sees something and in a second she imitates it. In all areas. It's probably because she hasn't heard, so in the course of time, she has developed this sense.

**Interviewer:** The visual aspect.

**Mother:** Yes, she developed it. Her visual sense is very developed. She can pick up something in a second and she'll do the same, and you saw that in all the video segments. So this is the first thing. And when she took the drum sticks "So I want this" and you understand that it's O.

**Interviewer:** Yes, she wants a little bit of control.

**Mother:** Yes. It's fun to see her free like this, and there are lots of things that she does at home in a similar way.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Mother:** She doesn't do... For example, this whole thing with the hand in her mouth, this is something that is not typical for her. It's the first time. Usually she doesn't put the hand in the mouth.

**Interviewer:** You were surprised to see this.

**Mother:** Yes.

**Interviewer:** How would you interpret this, how much? Why do you think the hand was in the mouth? Was it embarrassment, was it just indulgence, and was it instead of a pacifier, what thought do you have, what was it?

**Mother:** It seems to me all that you've mentioned. She might want a pacifier, or suddenly she became embarrassed, or you suddenly understand that she doesn't feel like doing something.

**Interviewer:** Yes, and this looked strange to you.

**Mother:** Yes.

**Interviewer:** You are not used to see this. Good.

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better? Please explain.

**Mother:** I didn't exactly understand the question.

**Interviewer:** Were there any behaviors there that you saw while you were watching the video segments and you could say- Now I understand why she behaves in a similar way at home or the opposite- why at home she behaves differently. Suddenly you could understand, you got an illumination, an insight regarding her behavior that you didn't have before.

**Mother:** No, the opposite- I have seen her as she is.

**Interviewer:** Ok. Legitimate, definitely ok.

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Mother:** This whole issue of music at home is not something we reinforce, so maybe in this area we can give her more musical instruments to try and play and see what she'll do, i.e., without guiding her, to give her and see how she will respond. In addition, at our home music is something that is not really...

**Interviewer:** Good. And this evoked thoughts in your mind that maybe it is worth trying it.

**Mother:** Yes, to bring it more deeply to her awareness. Maybe it will help.

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples?

**Mother:** She has lots of things. We have seen only a few. I believe that when I see it all, I will then see more characteristics of her that...

**Interviewer:** But let's say some specific things that you could say- "This is the thing I am missing. As if I would expect that if I had watched a bit more, I would have then seen it". Something that you missed, that you expected to see and was missing.

**Mother:** No. Precisely her imitation. She was very active with Dikla and... no. I don't think that... no, precisely she was very active with her and you see that she flowed along with her very, very nicely.

**Interviewer:** Good.

**Interviewer:** Your expectations prior to the start of the research were as follows: "...that she will enjoy, that it will succeed. And if it helps children with CI- we will be

happy" (copied from the questionnaire that was filled out before the research began). According to what you have seen in the videotapes and/or at home, were these expectations fulfilled? Would you please explain?

**Mother:** Yes. It's even funny because actually you don't know at all where you are going to. Only now, when you see more or less, you understand what she did with her. So yes, first of all, she enjoyed. In my opinion, she greatly enjoyed the individual sessions. She has been doing interesting things and yes, musical instruments in general. In general, music is something that should contribute to children with CI, and I think it's...It's enough this experience, this experiment that she went through... Without thinking, but it did do something...

**Interviewer:** Good, very nice.

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Mother:** No, it was cool, and from the beginning, in the beginning I wasn't very anxious but then you say to yourself, what you are getting into; maybe you don't need this mess. But no, it was nice, and I even think it was a constructive experience for O, actually a constructive experience.

**Interviewer:** Good, very nice. We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.





## נספח M12

### ראיון לאמה של O

ראיון זה יערך **בנפרד** לך ולבעלך. ראשית, נצפה במשך 10 דקות בקטעי וידאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתפי ככל שתוכלי באשר למה שראית והרגשת ביחס להשתתפות בתך בטיפול במוסיקה. הינך רשאית לומר לי לעצור את הוידאו בכל רגע, במידה ותרצי להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האם:** קודם כל לראות אותה... והאמת שכל הקטעים בשבילי בתור אמא הם יפים, אבל הקטע שהכי אהבתי זה הקטע שהכי ככה עשה לי זה הקטע הראשון. אני לא יודעת למה, אבל זה הקטע הראשון. לא יודעת, החיבור של ה... שהיא הבינה ושהיא מקשרת ככה את כל הדברים מסביב. אני בקטע הזה מאוד אוהבת שהיא עושה גם בבית. את הקטע הראשון מאוד מאוד אהבתי.

**המראיינת:** איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האם:** כן. בקטע הרביעי. לא יודעת, הכי פחות ככה... גם בקטע השני כאילו לא ממש אהבתי לראות את זה כאילו בפעם השנייה. פשוט הייתי מדלגת.  
**המראיינת:** או קיי, טוב. את יודעת להגיד למה?  
**האם:** כי זה נראה לי סתמי כזה. לא יודעת, כאילו נראה לי קטע סתמי. היא מחקה את הקול שלה. משהו כאילו בלי... לא יודעת, סתם.  
**המראיינת:** טוב, או קיי.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **דומות** של בתך בביתכם?

**האם:** כן, בטח. קודם כל אצל O הקטע של הראייה – היא רואה משהו ותוך שנייה היא עושה את אותו דבר. זה בכל התחומים. כנראה מקטע שלה שהיא לא שומעת אז עם הזמן...  
**המראיינת:** הקטע החזותי.  
**האם:** כן, היא פיתחה, יש לה את הקטע החזותי מאוד מאוד מפותח אצלה. מספיק לקלוט ממש בשבריר של דבר והיא תעשה את אותו דבר, ואת ראית את זה בכל הקטעים שלה. אז זה דבר ראשון. וכשהיא לקחה לה את המקלות של התופים "אז אני רוצה את זה" ואת קולטת שזאת O.  
**המראיינת:** כן, היא קצת רוצה שליטה.  
**האם:** כן. זה נורא כיף ככה לראות אותה שהיא חופשייה ויש הרבה דברים ככה כמו שהיא עושה בבית.  
**המראיינת:** כן, או קיי.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות **שונות/אחרות** של בתך?

**האם:** היא לא עושה. למשל העניין של היד בפה. בכלל זה דבר שלא אופייני לה. זה פעם ראשונה. היא לא מכניסה את היד לפה בדרך כלל.  
**המראיינת:** התפלות לראות את זה.  
**האם:** כן.

**המראיינת:** איך את מפרשת את זה, כמה? למה לדעתך היד הייתה בפה? זה היה מבוכה, זה היה סתם פינוק, זה היה במקום מוצץ, איזושהי השערה מה זה היה?  
**האם:** נראה לי הכל. או שהיא רצתה מוצץ, או שמבוכה כזאת פתאום או שאת קולטת פתאום שלא כל כך בא לה.

**המראיינת:** כן, וזה היה זר לך.

**האם:** כן

**המראיינת:** את לא רגילה לראות את זה. טוב.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות בתך טוב יותר?

**האם:** מה זאת אומרת?

**המראיינת:** האם היו איזה שהם התנהגויות שראית אותן תוך כדי הקטעים שצפית בהם ויכולת להגיד- עכשיו אני מבינה למה היא ככה וככה בחיים בחוץ, בבית ובהתנהגות שלה בכלל.

**האם:** לא, עדיין לא כל כך הבנתי את השאלה.

**המראיינת:** לפעמים, לראות אותה מתנהגת בצורה מסוימת זה פתאום נותן את האפשרות להבין למה בבית היא מתנהגת גם כן ככה או הפוך- למה בבית היא מתנהגת אחרת. פתאום משהו נתן ככה הבנה, איזושהי הארה על ההתנהגות שלה. איזושהי תובנה שלא הייתה לך קודם.

**האם:** לא. דווקא ראיתי אותה כמו שהיא.

**המראיינת:** בסדר, לגיטימי. בסדר גמור.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לבתך?

**האם:** הקטע של המוסיקה בבית זה לא תחום שאנחנו מחזקים אותו, אז אולי בקטע הזה אפשר לתת לה קצת יותר כלי נגינה לנסות לנגן בהם ולראות מה היא תעשה, זאת אומרת, בלי להדריך אותה, לתת ולראות איך היא תגיב. בבית אצלנו גם מוסיקה זה קטע שממש לא...

**המראיינת:** טוב. וזה ככה עורר בך מחשבה שאולי כן כדאי להכניס.

**האם:** כן, להחדיר לה למודעות יותר. אולי זה כן יעזור.

**המראיינת:** האם קיימים איפיונים התנהגותיים של בתך שלא באו לידי ביטוי בקטעי הוידאו שראית?

**האם:** יש לה המון דברים. ראינו רק חלק מהקטעים. אני מאמינה שאני אראה את הכל אז אני אראה גם עוד איפיונים שלה...

**המראיינת:** אבל נגיד ככה דברים ספציפיים שיכולת להגיד- זה חסר לי. כאילו הייתי מצפה שאם היו מראים עוד קצת אז הייתי רואה את זה, ככה משהו שהיה חסר לך. משהו שצופית לראות והיה חסר.

**האם:** לא. דווקא החיקוי שלה, היא הייתה מאוד פעילה איתה ו... לא, לא נראה לי ש... לא, דווקא היא הייתה פעילה איתה ואת רואה שהיא זרמה איתה מאוד מאוד יפה.

**המראיינת:** טוב.

**המראיינת:** ציפיותיך מהמחקר לפני תחילתו היו: "שהיא תהנה, שזה יצליח. ואם זה יעזור לילדים מושתלים אז אנחנו נשמח" (הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר), בהתאם למה שראית במהלך הפגישות וכן כעת בקטעי הוידאו, האם צפיותיך התמלאו? אנה הסבירי.

**האם:** כן, אפילו זה מצחיק כי בעצם את לא יודעת לקרוא מה את הולכת בכלל. רק עכשיו שאת רואה פחות או יותר אז את מבינה מה עשו אתה. אז כן, קודם כל היא נהנתה. לדעתי, היא נהנתה מאוד בפגישות מאחד על אחד. היא עושה דברים מעניינים וכן, בכלל כלי נגינה, בכלל מוסיקה זה דבר שצריך לתרום לילדים עם שתלים ואני חושבת שזה... מספיק הניסיון הזה, הניסוי שהיא עברה זה, בלי לחשוב אבל זה כן עשה...

**המראיינת:** טוב, יופי.

**המראיינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתפי.

**האם:** לא, זה היה נחמד ומהתחלה, בהתחלה לא חששתי מאוד אבל את אומרת למה את נכנסת, אולי לא צריך את כל הבלגן הזה, אבל לא זה היה נחמד ואפילו ואני חושבת של-O זה היה חוויה שהיא בונה, חוויה בונה בעצם. זה היה נחמד.

**המראיינת:** טוב, יופי. תודה רבה. סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.

## Appendix M13

### Interview of O's father

**Interviewer:** This interview will be carried out individually, at different times, with you and your wife. First, we will watch 10 minutes of short video segments chosen from the music therapy intervention. Then, we will view it once more, to enable you to answer the questions in this interview more easily. Before the second viewing, I will ask you two specific questions regarding a moment that you really liked the most in the video tapes, and a moment, which you liked the least. These questions are designed to help you pinpoint your response to certain aspects of the video. After you answer the specific questions, I will ask you a few more questions of a general nature. Please reflect on what you saw and felt in relation to your child's participation in music therapy. Please feel free to ask me to stop the video at any time if you want to make any specific comments.

**Interviewer:** What was the most enjoyable and/or thrilling moment for you?

**Father:** The truth is that I liked all the parts, and it is difficult to find a part I didn't like, but maybe, just maybe, 1 or 2, that she was more participating in... more pointing at things... kind of you can see that she hears, she reacts to the hearing, that she relates to the things she hears, that there is more connection to hearing; everything is beautiful.

**Interviewer:** So it meant more or was more moving?

**Father:** Yes, it meant more. Not more moving. Moving – everything was beautiful because it is my daughter.

**Interviewer:** Excellent

**Interviewer:** Still - what moment or part of a session did you like the least?

**Father:** (laughter) Do I have to say? Does it have to be such a part? I have not seen.

**Interviewer:** It's not compulsory. No.

**Father:** Each part has its uniqueness, but I felt that maybe the last part when they make these sounds, it was like... how can I explain, as one who knows O, she can talk her head off without any connection, but even this was nice.

**Interviewer:** Yes, right, nice.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain.

**Father:** When she was knocking on things, also at her grandmother's she really likes to take a fork and knock on glasses, bottles, and if her grandmother knocks on the upper part of the bottle, she knocks on the lower part, the same thing, and when she points at something she identifies then she has this at home too, when she recognizes a noise or identifies the phone then she goes... gets to it immediately.

**Interviewer:** So it reminded you.

**Father:** Yes.

**Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **different** reactions at home?

**Father:** In the same conditions then not, I don't think so.

**Interviewer:** It doesn't have to be the same conditions. Sometimes there is some association to something else but...

**Father:** At home she was getting much more angry if we would try to do these things with her. She was...

**Interviewer:** Less patient?

**Father:** Less patient and she wouldn't let us do it. Here nobody got close to her. At home apparently, somebody was getting close to her, and she was more kind of under pressure because of the preserving of her territory. But here she seems more relaxed and...

**Interviewer:** She got enough space.

**Father:** Yes. She was sure that when she wants the stick – she gets it. It can't go to someone else.

**Interviewer:** Good

**Interviewer:** Does anything that you just saw in these short segments help you perceive and understand your child better? Please explain.

**Father:** What does it mean her behavior?

**Interviewer:** There were here some behavioral issues, for instance the things with waiting in line, does she wait in line, waits until Dikla knocks first and then she knocks. For example, this is a behavioral issue.

**Father:** This is an example, that at home she has little patience. She wants to be first, she wants... it is very seldom that she waits to see what I do in order to... except for the first time, on the first time she waits but not more. As a principle. But the thing of knocking she will wait if she knows I try to do something with her, but she will lose her concentration a bit faster in my opinion.

**Interviewer:** Yes?

**Father:** Yes

**Interviewer:** OK

**Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Father:** Yes, the parts with the music that she copies the sound. The first part of playing to her sounds and she will identify them in the area. The same when she made her hear the dog and she looked for the dog's picture or something close. You can do more with her about this. The truth is that at home we don't work with her so much on these things. We try more speech, you know, but yes, apparently it is a better idea.

**Interviewer:** OK.

**Interviewer:** Are there any characteristics of your child's behavior that you feel are missing in the video examples?

**Father:** I expected her to be as I said, taking more initiative, but she really waited and wanted to see what is expected of her. Yes. Usually she would say "here" and she would decide what she does next... if she would tell her the way she said to play the small drum. – then she did knock on the small drum. When she told her cymbals- she moved to the cymbals so understandingly she was there and she did this on all possible places.

**Interviewer:** Good

**Interviewer:** Your expectations prior to the start of the research were as follows: "That O will like music and will enjoy it" (copied from the questionnaire that was filled out before the research began). According to what you have seen in the videotapes and/or at home, were these expectations fulfilled? Would you please explain?

**Father:** Yes, I think she had a good time.

**Interviewer:** She had a good time there.

**Father:** The fact is that I didn't expect her to develop out of this one more channel of communication or of hearing or something, since she reacts quite well to sounds.

I wanted her to enjoy it. That she will have...

**Interviewer:** Yes, good. Nice.

**Father:** Some nice period of time with her.

**Interviewer:** If you have any additional thoughts and/or comments, would you please share them:

**Father:** I hope it will come out well, that with God's help it will bring maybe some help to other children or show some points, then it will be the sign that we have done our duty. And I also have some pictures to see her, while we didn't take pictures of her until now (laughter).

**Interviewer:** Yes, Ah! Opportunity. We have finished the interview. On behalf of Dikla and myself, I would like to thank you very much for your cooperation.



## נספח M14

### ראיון לאביה של O

**המראיינת:** ראיון זה יערך בנפרד לך ולאשתך. ראשית, נצפה במשך 10 דקות בקטעי וידאו קצרים שנבחרו מתוך פגישות הטיפול במוסיקה. לאחר מכן, נצפה שוב בקטעים הללו כדי לאפשר לך לענות על השאלות בראיון בקלות רבה יותר. לפני הצפייה החוזרת אשאל אותך שתי שאלות מסוימות באשר לרגע שאהבת ביותר בצילומים וכן באשר לרגע שאותו אהבת הכי פחות. לאחר מכן, אשאל אותך מספר שאלות בעלות אופי כללי יותר. אנא שתף ככל שתוכל באשר למה שראית והרגשת ביחס להשתתפות בתך בטיפול במוסיקה. הינך רשאי לומר לי לעצור את הוידאו בכל רגע, במידה ותרצה להעיר הערה כלשהי.

**המראיינת:** מהו הרגע שהיה עבורך המרגש ביותר לצפייה?

**האב:** האמת שכל הקטעים מצאו חן בעיני וקשה מאוד למצוא קטע שלא מצא חן בעיני, אבל אולי 1 ו-2 שמה היא יותר משתתפת ב... יותר מצביעה ל... כאילו רואים שהיא שומעת, שהיא מגיבה לשמיעה, שהיא מתייחסת לדברים שהיא שומעת, שיש יותר קשר לשמיעה; הכל יפה.

**המראיינת:** ולכן זה היה יותר משמעותי או יותר מרגש.

**האב:** כן, יותר משמעותי. לא מרגש. מרגש-הכל יפה כי זה הבת שלי.

**המראיינת:** בסדר גמור.

**המראיינת:** בכל זאת, איזה רגע או חלק מתוך פגישה מסוימת אהבת הכי פחות?

**האב (צוחק):** אני חייב להגיד? חייב להיות כזה קטע? כי לא ראיתי.

**המראיינת:** בכוח-לא.

**האב:** לכל קטע היה את הייחודיות שלו, אבל הרגשתי שאולי בקטע האחרון שהם עושים את הקולות, אז זה כמו..., איך אני אסביר, בתור אחד שמכיר את O, היא יכולה לקשקש ככה בלי קשר, אבל זה גם היה נחמד.

**המראיינת:** כן, נכון, יפה.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות דומות של ילדך בביתכם?

**האב:** כשהיא הקישה על הדברים, אז גם בבית סבתא שלה המון אוהבת לקחת מזלג ולהקיש על כוסות, ועל בקבוקים, והיא מיד-אם הסבתא מקישה למעלה, היא מקישה למטה, אותו דבר, וגם כשהיא מצביעה על משהו כשהיא מזהה אז יש לה את זה גם בבית, כשהיא מזהה איזה רעש או מזהה טלפון אז היא הולכת ... נגשת אליו מדי פעם.

**המראיינת:** אז זה הזכיר לך.

**האב:** כן.

**המראיינת:** בזמן הצפייה, האם היו לך מחשבות/זיכרונות כלשהם באשר לתגובות שונות/אחרות של בתך?

**האב:** באותם התנאים אז לא, לא חושב.

**המראיינת:** לא חייב להיות אותם תנאים. לפעמים ככה באסוציאציה זה משהו אחר אבל...

**האב:** בבית היא הייתה הרבה יותר רגזנית אם היינו עושים אתה את הדברים האלה. היא...

**המראיינת:** פחות סבלנות?

**האב:** פחות סבלנות והיא לא הייתה נותנת. הרי פה אף אחד לא התקרב אליה. בבית, מן הסתם, מישהו היה מתקרב אליה, אז היא הייתה יותר לחוצה כזה מעצם זה של לשמור על הטריטוריה שלה. אבל פה היא נראית הייתה שלוה ו...

**המראיינת:** נתנו לה מספיק מקום.

**האב:** כן, היא הייתה בטוחה שכשהיא רוצה את המקל-היא תקבל אותו. הוא לא יכול ללכת למישהו אחר.

**המראיינת:** טוב.

**המראיינת:** האם הצפייה בקטעי הוידאו תרמה לך להבין את התנהגות בתך טוב יותר? אנא הסבר בבקשה:



**האב:** מה זאת אומרת את ההתנהגות שלה?

**המראיינת:** הרי סך הכל היו פה קטעים התנהגותיים, למשל, קטעים של לקיחת תור, האם היא מחכה בתור, מחכה שקודם דקלה תקיש ואחר כך היא מקישה. למשל, זו צורה של התנהגות.

**האב:** זה דוגמה שבבית היא קצת קצרת סבלנות. היא רוצה להיות הראשונה, היא רוצה... מאוד נדיר שהיא תחכה לראות מה אני עושה כדי... אלא אם כן זה פעם ראשונה, אז בפעם הראשונה היא תחכה ולא יותר. כעיקרון. אבל בעניין של ההקשות- היא כן תחכה אם היא יודעת שאני מנסה לעשות איתה, אבל היא תאבד את הריכוז קצת יותר מהר, לפי דעתי.

**המראיינת:** כן?

**האב:** כן.

**המראיינת:** או קיי.

**המראיינת:** האם קטע כלשהו מתוך מה שראית בקטעי הוידאו תרם לך רעיונות כיצד לעזור לבתך?  
**האב:** כן, הקטעים עם המוסיקה שהיא מחקה את הצליל. קטע מס' 1 של להשמיע לה צלילים והיא תזהה אותם בשטח. כמו שהיא השמיעה לה את הכלב אז היא חפשה את התמונה של הכלב או משהו כזה. אפשר יותר לעבוד איתה על זה. האמת שבבית אנחנו לא כל כך עובדים איתה על הקטעים האלה. מנסים יותר דיבור, את יודעת, אבל כן, מן הסתם, זה רעיון די טוב.

**המראיינת:** או קיי.

**המראיינת:** האם קיימים איפיונים התנהגותיים של בתך שלא באו לידי ביטוי בקטעי הוידאו שראית? אנא תן מספר דוגמאות.

**האב:** הייתי מצפה שהיא תהיה כמו שאמרתי יותר יוזמת שמה אבל היא די חכמה ורצתה לראות מה רוצים ממנה. כן, שבדרך כלל אם היא הייתה אומרת "פה" אז היא תחליט עכשיו שהיא תעשה... אם היא הייתה אומרת לה כמו שהיא אמרה לה לתופף על התוף הקטן- אז היא תופפה על התוף הקטן. כשהיא אמרה לה מצילתיים- היא עברה למצילתיים אז מן הסתם היא הייתה פה והייתה עושה את זה בכל מקום שאפשר.

**המראיינת:** טוב.

**המראיינת:** ציפיותך מהמחקר לפני תחילתו היו: "שהיא תיהנה מהעבודה". (הקטע הועתק מתוך השאלון שמולא על ידך לפני תחילת המחקר). בהתאם למה שראית בקטעי הוידאו ו/או בבית, האם צפיותך התמלאו?

**האב:** כן. נראה לי שהיא מאוד נהנתה.

**המראיינת:** היה לה טוב שם.

**האב:** האמת שלא ציפיתי שהיא תפתח מזה עוד ערוץ תקשורת או של שמיעה או משהו כזה, כי היא די מגיבה לצלילים. רציתי שהיא תיהנה. שיהיה לה...

**המראיינת:** כן, טוב. יפה.

**האב:** איזושהי תקופה יפה איתה.

**המראיינת:** במידה ויש לך הערות ו/או מחשבות נוספות, אשמח אם תשתף:

**האב:** אני מקווה שזה יצא לטוב, שבעזרת השם זה יוכל להביא אולי תועלת לילדים אחרים או להצביע על איזה שהן נקודות, ואז זה סימן שעשינו את שלנו. וגם יש לי איזה כמה תמונות לראות אותה, מה שלא צילמנו אותה עד עכשיו (צוחק).

**המראיינת:** כן, אה? הזדמנות. סיימנו את הראיון. בשם דקלה ובשמי, אני רוצה להודות לך מאוד על שיתוף הפעולה.

Dikla Kerem

### Song 1: La la la

Natalie Werbner, RMT, adapted by Dikla Kerem

Natalie Werbner, RMT, adapted by Dikla Kerem

The musical notation is written on a single staff in treble clef. The key signature has three sharps (F#, C#, G#), indicating A major or F# minor. The time signature is 2/4. The tempo marking is ♩ = 80. The melody consists of eighth notes. The lyrics are: La la la la la la la la la la la la la.

Dikla Kerem

**How how how how**

**ke - lev no - ve - ach how how how how**

**ke - lev no - ve - ach how how how how**

**(Woof woof, the dog is barking)**

Natalie Werbner, RMT, adapted by Dikla Kerem

Natalie Werbner, RMT, adapted by Dikla Kerem

Pa pa pa au - to ba Pa pa pa au - to ba

Note: Play 3rd and 4th time at ♩ = 130

Pa pa pa, a car is coming

Dikla Kerem

Shā-lom leh-hit-ra - ot leh (child's name) shā-lom ul-eh-hit-ra - ot  
(Goodbye)

Notes:

1. The therapist sang the songs one octave lower.
2. Songs' lyrics were written in transliteration.
3. Songs' names (#2, 3, 4) were written in transliteration.



## Appendix O

### Pictures associated with the recorded songs

- The actual size of each of the three pictures used by the children was 10 X 15 cm.
- The song title is presented under each picture and the content of the song is in brackets.



**Song 1: La la la (A girl is singing)**



**Song 2: "How-how"<sup>1</sup> (A dog is barking)**



**Song 3: Auto ba (A car is coming)**

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<sup>1</sup> In Hebrew, the sound of a barking dog is described as "how-how" which is equivalent to the English word "bow-wow."



## **Appendix P**

### **Coding guidelines for session analysis**

A full transcript of the DVD watching instructions and coding guidelines for effective session analysis in music therapy and play sessions are presented in this appendix. These guidelines and instructions were developed as a result of repeated observations of the music therapy and the play sessions by the researcher, in order to be able to accurately note the frequency and/or durations of the children's spontaneous communicative interactions.

First, some general useful instructions for watching the DVD's will be presented, followed by coding guidelines that include operational definitions of each interaction as well as further elaboration of these definitions in order to reach reliable coding.

#### **Instructions for watching the DVD's**

Analyzing video material is time-consuming. It requires a high level of concentration and vigilance due to the repeated observations needed to accurately code the behaviors under investigation; therefore, a quiet environment and adequate time to do it may ease the process. Lapses in attention and fatigue can cause poor coding, and thus, decrease reliable and valid measurement; therefore, discontinuing coding in such cases is recommended.

Below are instructions for watching the DVD's:

1. Watch each child-therapist interaction as many times as needed to ensure accurate and valid recording of data. In the ASUS DVD XP software that you are using, this is done by clicking with the control wheel along the outside perimeter for shuttling forward and reverse at various speeds during playback or by using the speed slider that visually appears when pointing with the mouse on the top of the screen; for example, you can play the specific interaction at slower motion speeds such as 1/2 or 1/4 of the normal speed until you are satisfied with your coding decision (More options of repeating scenes are offered in the software). It is necessary to practice using the software effectively before starting the coding process.
2. When you cannot fully observe the interaction (due to partial coverage of the video camera), use the other DVD of the same session that you received. The latter includes the same video material that was filmed from a different angle by the second video camera in the room.
3. Focus carefully on each interaction and record as accurately as possible when each interaction starts. For synchronization and turn-taking, watch also when these two interactions end, and note their durations in the corresponding boxes. Use the time counter on the software for this purpose. For turn-taking, count the number of events of turn-taking and write them down.
4. When you have made your decision, please use the session analysis-coding sheet and record the code for each specific interaction. The codes appear on the coding sheet.

## Coding guidelines

A spontaneous communicative interaction has to be clearly identified in the video material. The spontaneity of the interaction must be definitely observed, i.e., the child is not cued or directed towards a certain act, but spontaneously starts an interaction. If the child responds to something that is done by the therapist, it should not be considered spontaneous, even though the child was not directed by the therapist to do something.

An interaction can be coded only in one category. For example, if turn-taking includes imitation of the therapist's action by the child, imitation will not be recorded as an additional identified interaction; If the child synchronizes with the therapist's action by joining in with the same or similar action, the interaction will be recorded only as synchronization and the imitation included will not be noted as additional interaction.

The four spontaneous communicative interactions for coding are as follows:

**1. Spontaneous imitation:** Spontaneous reproduction, echo, or attempt to imitate music therapist's action made by the child within 10 seconds or less from the action the child is imitating.

A two-three year old child often cannot exactly imitate or copy the therapist's action, but can follow the manner or style of the therapist. If the child's action is clearly identified with an intention of doing what the therapist does, the behavior should be coded as spontaneous imitation by writing the appropriate code in the corresponding box.

The therapist's action has to end before the child starts the same action or a similar one. This is what differentiates spontaneous imitation from spontaneous synchronization.

There is no need to note whether the imitation was verbal, vocal, gesture instrumental, etc.

**2. Spontaneous initiation:** A communicative act (verbal, vocal, instrumental, gesture<sup>1</sup>, etc.) demonstrated spontaneously by the child with the apparent intention of initiating an interaction with the music therapist.

Initiation is any behavior used to obtain and/or direct the therapist's focus of attention that occurred when there is no on-going interaction between the child and the therapist or when the child spontaneously starts a new communicative act within an existing context; for example, both child and therapist are playing the bongos and suddenly the child changes the rhythmic pattern, looks at the therapist and expects the therapist to follow him/her. This will be considered as spontaneous initiation and its code will be noted in the appropriate box.

A child's initiation that is a response to the therapist's action is not considered as a spontaneous initiation.

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<sup>1</sup> Gesture: Actions produced with the intention to communicate and typically involve fingers, hands, and arms and also may employ facial features (e.g., lip smacking for 'cookies') or even the entire body (e.g., bouncing up and down for 'horse') (Iverson & Thal, 1998).

**3. Spontaneous turn-taking:** The child spontaneously initiates an act (verbal, vocal, instrumental, gesture, etc.), then waits or listens for a response from the music therapist. This procedure is repeated twice. These four steps will be considered as one *event* of turn-taking, i.e. C-T-C-T, (C means ‘child’ and T- therapist). Frequency, duration and number of events of turn-taking should be noted in the appropriate boxes on the coding sheet.

One frequency of spontaneous turn-taking is one occurrence which may include one *event of turn-taking*, or a series of consecutive *events* of turn-taking (with no pause between them); The event may start with a specific action such as using an instrument/ /voice/toy and proceed to a different action; the duration of this occurrence may vary from a few seconds to a few minutes, depending on the interaction. A minimum of five seconds must elapse before new turn-taking events are considered an additional frequency. The duration of turn-taking is measured from the second the child initiates the turn-taking to the last second of the occurrence, when the therapist ends her turn. Additional action of the child after the event/s is/are over, such as C-T-C-T-C, should not be included in the duration measurement.

The children in this study are very young; therefore, sometimes it was difficult for them to wait until the therapist completely finished her turn and there was a short overlapping within the turn-taking event/s. This should be coded as spontaneous turn-taking.

**4. Spontaneous synchronization:** The child matches<sup>2</sup> the music therapist’s action spontaneously and simultaneously (rather than successively).

The therapist has to start an action and then the child spontaneously joins in while continuing together for a certain amount of time. Both frequency and duration should be noted for this interaction. The occurrence is considered a spontaneous synchronization if it lasts two seconds or more. The duration of a specific synchronization should be measured from the moment the child joined in, rather than the moment that the therapist started that action.

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<sup>2</sup> Matching:

(a) In music therapy: “Improvising music that is compatible, matches or fits in with the client’s style of playing while maintaining the same tempo, dynamics, texture, quality and complexity of other musical elements.” To achieve a ‘match’ in musical terms means that the therapist’s music is not identical to the client’s, but is the same in style and quality. Therefore the client experiences that the therapist’s music ‘fits together and matches’ his or her own production (Wigram, 2004, p. 84)”

(b) In play: Playing in a way that is compatible, matches or fits in with the client’s style of playing while maintaining the same dynamics, quality and complexity presented by the client in their play. To achieve a ‘match’ in keeping with the above definition of musical terms means that the therapist’s play is not identical to the client’s, but is the same in style and quality. Therefore the client experiences that the therapist’s play response ‘fits together and matches’ his or her own playing style (PhD course, Aalborg University, November 2006).





## Appendix Q

### Contents of the DVD

#### Introduction

Five children participated in this study: Ay, O, C, Af, and Z. These video examples are designed to illustrate the different communicative interactions and the two conditions that were analyzed. One child's video cannot be represented as parents did not give permission. In order to ensure that data from the study is well represented in the video examples, three out of the four remaining children's data were randomly chosen to illustrate communicative behaviors, and two out of the four to illustrate the different conditions. From the randomly chosen data, specific examples were selected that best illustrate the communicative behaviors under analysis

#### Contents of DVD

The main menu of the DVD includes three main chapters:

1. Spontaneous communicative interactions:  
Examples of spontaneous imitation, initiation, turn-taking and synchronization, were chosen from three children: Ay, O and C. Each behavior is presented twice for each child: once in play and once in music therapy. Altogether, for each child, there are four examples from music therapy and four from play. Further detailed explanations of this chapter can be found below.
2. Directed and non-directed experiences<sup>1</sup>:  
Each session in this study lasted 20 minutes. This time period was divided into two parts: 10 minutes that were *directed* by the music therapist (see section 3.7) and 10- *not directed* by her. Examples were chosen of two children: Af and Ay. For *each* child, four examples are presented:
  - a. Two examples from music therapy (two minutes of experience directed by the music therapist and two minutes *not* directed by her);
  - b. Two examples from play (same as in music therapy).
3. Overview:  
A two-minute overview that includes a short example from the play condition and different experiences from music therapy: Playing instruments, exploring the voice, and listening experiences. The examples were chosen from the video material of Ay and C.

Each chapter of the first two main chapters consists of two sub-chapters: One sub-chapter for music therapy and one for play.

The details of the main chapter entitled 'spontaneous communicative interactions' are presented below. It is recommended that prior to watching the DVD, the reader should read the description of the child's communicative interaction that he/she is supposed to *focus on* in the DVD. Words that are relevant to the communicative interaction were written in italics. Each time, the behavior under

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<sup>1</sup> These experiences can also be understood as 10 minutes of child-led activity followed by 10 minutes of therapist-led.

consideration appears a few *seconds after* the beginning of the clip. This ‘lead-in’ time enables the reader to see the spontaneity of the behavior.

**Please note:** Going back ‘home’, i.e. to the main menu, is done by moving with the arrows of the remote control (or those that are on the DVD player), to the small icon of a house on the bottom right side of the main chapter screen. To exit from watching a video clip, click on ‘menu.’

## **Main chapter: Spontaneous communicative interactions**

### **Sub-chapter: Child’s name: Ay**

#### **1. Music therapy**

**a. *Spontaneous imitation:*** The therapist shakes a tambourine on her shoulder. Ay looks at the therapist, bends to the floor, takes another tambourine and *spontaneously imitates* the therapist. When the therapist offers Ay the tambourine that she used, Ay *imitates* her again with that. The therapist then shakes two tambourines on her shoulders. Ay stretches out her hands as if she wants to try it as well. The therapist gives Ay the tambourines and she *imitates* this action. All three imitations were *spontaneous*.

**b. *Spontaneous initiation:*** Ay says something to her mother while showing her one of the handle castanets, and then *spontaneously gives* the therapist matching castanets. (Then she initiates playing with the castanets, an action which develops into a turn-taking and is seen only partly in this video clip).

**c. *Spontaneous synchronization:*** The therapist plays ‘hello song’ in the beginning of the session. Ay takes a drumstick and *spontaneously starts synchronizing* with the therapist by beating the bongos and looking at her for a period of 9 seconds.

**d. *Spontaneous turn-taking:*** Turn taking starts when Ay pushes down the therapist’s hands (after a few seconds from the beginning of the clip) and *spontaneously initiates* her own vocalization, which develops into *turn taking* of 10 events that last 35 seconds altogether.

#### **2. Play**

**a. *Spontaneous imitation:*** Ay shows a plastic toy dog to the therapist. The therapist says ‘kelev’, (the Hebrew word for ‘dog’) followed by ‘how’, (the Hebrew word used for a dog’s bark). Ay *spontaneously imitates* it. This repeats itself a couple of times.

**b. *Spontaneous initiation:*** Ay plays with Duplo blocks together with the therapist. She takes a plastic window of the Duplo, opens it and *spontaneously looks through at the therapist*, while the therapist responds by saying “cuckoo”.

**c. *Spontaneous synchronization:*** The therapist is building a cart from Duplo blocks, while Ay *spontaneously stretches out her hand*, holds on to the cart *together* with the therapist and then takes it and starts to move it on the rug.

**d. *Spontaneous turn-taking*:** Ay holds a wooden piece of a car, *puts* it where she thinks it belongs in the inset puzzle she is playing with and *raises her head, waiting for a response* from the therapist. The therapist says “no” and makes a sign of ‘no’ with her finger. Ay *puts* it in another place, *raises her head* again and *waits again for response*. The therapist nods her head indicating ‘yes’. That is one event of turn taking.

## Sub-chapter: Child’s name: O

### 1. Music therapy

**a. *Spontaneous imitation*:** The therapist plays the electronic keyboard with a mallet. O spontaneously *imitates* her playing style.

**b. *Spontaneous initiation*:** O gets up from the floor and goes to the cymbal. She *spontaneously bangs* the cymbal with the mallet *while looking* at the therapist.

**c. *Spontaneous synchronization*:** O listens to a CD recording of a song sung by the therapist. For three seconds she *spontaneously synchronizes* with the singing by beating the bongos with a mallet.

**d. *Spontaneous turn-taking*:** O and the therapist play on the electronic keyboard. O *spontaneously initiates* a glissando<sup>1</sup>. The therapist imitates her, O repeats it again, and the occurrence develops into eight events of turn-taking.

### 2. Play

**a. *Spontaneous imitation*:** The therapist ‘eats’ a plastic bun, makes it disappear in her shirt as if she swallows it and asks O “eifo” (The Hebrew word for ‘where’). O *spontaneously repeats* the word “eifo” and *imitates* the therapist’s action as well.

**b. *Spontaneous initiation*:** O puts plastic toy fruits in a pot. Then, *spontaneously*, she picks up the peach from the pot and *shows* it to the therapist.

**c. *Spontaneous synchronization*:** The therapist wants to reinforce O, by picking up the inset puzzle to show O how nicely she did it, while O *spontaneously joins* and *holds it* with the therapist for 4 seconds.

**d. *Spontaneous turn-taking*:** O puts the plastic bucket on her head, and *spontaneously vocalizes* within it. She then lifts it up a bit and *looks at the therapist*. The therapist imitates her. The process continues with variations. Altogether, four events of turn-taking are developed.

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<sup>1</sup> Glissando: “When applied to playing the piano and the harp, glissando generally refers to the effect obtained not by fingering the key or strings of scales but by sliding over them rapidly with the fingernails or the fingertips” (Boyden, 1980).

## Sub-chapter: Child's name: C

### 1. Music therapy

**a. *Spontaneous imitation*:** C listens to a CD recording of a song sung by the therapist. The words of the song are “la la la”. *Spontaneously*, when the song is over, she *says* “la la la”.

**b. *Spontaneous initiation*:** C plays the electronic keyboard when suddenly she *spontaneously* stops her playing, *looks at the therapist, shouts and claps hands*.

**c. *Spontaneous synchronization*:** C listens to a song being sung by the therapist on a CD. Then she *spontaneously* turns around to the electronic keyboard. She puts one hand on the songbook and with her other hand, she tries to *simultaneously play along* with the song for 13 seconds.

**d. *Spontaneous turn-taking*:** C beats the cymbal and then, with her pacifier in her mouth, she *spontaneously shouts while looking at the therapist*. The therapist vocalizes back. This occurrence is repeated twice, and thus, one event of turn-taking event is developed.

### 2. Play

**a. *Spontaneous imitation*:** The therapist says the word “auto” while playing with C. C *spontaneously repeats* the same word.

**b. *Spontaneous initiation*:** C builds something from the Duplo blocks. She then *spontaneously shows* what she built to the therapist.

**c. *Spontaneous synchronization*:** Not found in any of C's video material.

**d. *Spontaneous turn-taking*:** C takes the plastic orange, and *spontaneously throws* it to the therapist, who throws it back to her. This process repeats itself twice thus creating one event of turn taking.

## Appendix R

### Guidelines for choosing video segments for parent interview

You are going to watch a DVD that includes video excerpts which have been chosen from the music therapy intervention with a young child who is deaf and has undergone cochlear implantation. The different clips on the DVD present events of the child's communicative interactions such as imitation, initiation, etc. that are demonstrated *spontaneously*<sup>1</sup> by the child's use of musical instruments, voice, body movements, or other non-musical equipment/object that is in the room.

The DVD you received (and every other DVD you receive in the future), lasts about 20 minutes and consists of a series of video clips. The video clips may differ in their duration; therefore, the number of clips on each DVD can change from one child to the other, but its total duration for each child will always be about 20 minutes.

On a specific DVD, each video clip has a number which appears before each clip. Please choose the clips that you think clearly demonstrate the greatest number of spontaneous communicative interactions. Give the highest score to the best clip (i.e., 12 points, if there are 12 clips on this specific DVD, or 14 points if there are 14 clips on another DVD, etc.) and the lowest score (i.e., one point) to the clip you think had the smallest number of spontaneous communicative interactions. Using a blank sheet of paper, please write the child's name, the number of each video clip and the score you gave it.

Please feel free to watch the DVD as often as you need in order to make your decision.

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<sup>1</sup> 'Spontaneously' means that I am interested in how the child responds without anyone cueing or trying to encourage her/him to respond.



## Appendix S

### Parent questionnaires: Parent free-text answers

The results from the analysis and documentation of the parent free-text answers on the pre- and post-intervention questionnaires are presented below. The following results include only the parents' direct answers to those questions that requested free-text answers. Therefore, the questions are not presented in their entirety here, and only those specific items that required a free-text answer were taken from the questionnaires for inclusion.

For each question, the parents who gave comments for free-text answers, whether they reported pre- *and* post-intervention or just pre- *or* post-intervention, their comments will be included in this appendix. Where parents (mother or father) have not offered any comments in the pre- and post-intervention questionnaires, those results were not presented.

A number of responses given on the Likert scales have already been analyzed separately, and the following analysis of the free-text answers is concerned with other responses. It should be emphasized that parents were directed towards a place in the questionnaire where they could voluntarily offer information, but they were advised that this additional information was not obligatory. Consequently, a number of parents who have not offered any free-text answers for many of these questions could well have felt that they had already supplied as much of the required information that was necessary or possible for them to recall through the Likert scale assessment. Therefore the responses need to be considered as additional to the existing data that has been documented in section 4.2.2.1.

When parents responded to the free-text answers, they usually referred to their daughter and son as 'she' and 'he' rather than saying the name of the child.

In order to reduce the repetition in the text, abbreviations of the child and parent's name will be used as follows:

1. The first letter or the first two letters indicate the child's name.
2. The name is followed by 'F' for father and 'M' for mother.

When the sign "N.R" after the word "Pre" or "Post" appears, it means that there was no answer from the parent for this item on the questionnaire.

#### Abbreviations:

AfF = Af's father.  
 AfM = Af's mother.  
 OF = O's father.  
 OM = O's mother.  
 AyF = Ay's father  
 AyM = Ay's mother.  
 CM = C's mother.  
 ZM = Z's mother.  
 ZF = Z's father.

**1.** How does your child spontaneously respond to music, which is heard at home via recordings or radio (**not** including TV or videos)?

Note: The music must be at a volume above the child's threshold of hearing.



(i) Other responses. Explanation:

**AfM:**

**Pre:** “Af claps hands and responds more when his sister or other people in the family dance and clap hands. He tries to do “la la la” when I do it or when he is given a microphone”.

**Post:** N.R

**ZM:**

**Pre:** “She mainly responds when she asks to listen. However, she has enough of it (quite quickly...)”.

**Post:** “Usually she asks to turn it off after a while”.

**AyM:**

**Pre:** N.R

**Post:** “She sometimes does movements as if she is playing the electronic keyboard and she moves her mouth”.

**OF:**

**Pre:** N.R

**Post:** “When she has an audience, she really performs- a song, a dance, etc”.

**2. Pre-intervention question:** Do you have any musical instrument at home? (a) Yes (b) No

If 'Yes', what kind of instrument(s)?

**Post-intervention question:** Have you purchased a musical instrument (or musical instruments) since the research has started?

**AyF:**

**Pre:** “Electronic keyboard for children”.

**Post:** “A drum; a xylophone”.

**AyM:**

**Pre:** “Electronic keyboard for children”.

**Post:** “A drum; a xylophone”.

**OF:**

**Pre:** “A drum; a xylophone”.

**Post:** N.R

**OM:**

**Pre:** “A drum; a xylophone”.

**Post:** N.R

**AfM:**

**Pre:** “We have all kinds of bells, a small toy drum and children’s maracas”.

**Post:** “We have plastic musical instruments for children such as bells, drums (a small one and a bigger one), etc”.

**ZM:**

**Pre:** N.R

**Post:** “Electronic keyboard”.

**ZF:**

**Pre:** N.R

**Post:** “Electronic keyboard”.

Does any family member at home play this (or these) instrument(s)?

(a) Yes (b) No

If 'Yes', how does the child spontaneously respond to the playing?

(i) Other responses. Explanation:

**AyM:**

**Pre:** N.R

**Post:** “She tries to sing by doing “la la la” with her mouth”.

**AyF:**

**Pre:** N.R

**Post:** “She moves her head to the left and to the right and sings “la la la”.

(j) Does the child try to produce sounds with this (these) instrument(s)?

(a) Yes (b) No

If s/he does, please describe:

**AyM:**

**Pre:** “She plays the keyboard by pressing down the keys and moves from side to side”.

**Post:** “She herself plays the keyboard and enjoys the sounds”.

**AyF:**

**Pre:** “She presses the keys of the electronic keyboard”.

**Post:** “She presses the keys and moves from side to side”.

**OF:**

**Pre:** “She loves playing the toy drum and the xylophone”.

**Post:** N.R

**OM:**

**Pre:** “She plays the xylophone”.

**Post:** N.R

**AfM:**

**Pre:** N.R

**Post:** “Af loves the drum. Every time we decide to play with the musical instruments, he chooses the drum”.

**ZM:**

**Pre:** N.R

**Post:** “She randomly plays the keyboard, presses down the buttons. She did this mainly when it was new”.

**ZF:**

**Pre:** N.R

**Post:** “She turns it on and off and presses the buttons to have background music”.

**3.** Are there certain musical sounds or styles of music that your child likes to listen to?

(a) Yes (b) No

If 'Yes', what are her/his preferences?

**CF:**

**Pre:** “Music from a cassette tape recorder”.

**Post:** “Cassette of Hassidic music”.

**CM:**

**Pre:** “Cassette tape recorder; songs sung by me”.

**Post:** “She likes to listen to the electronic keyboard at her aunt’s house and to cassettes of Hassidic music”.

**AfF:**

**Pre:** “Af’s preferences are not clear. Sometimes when we listen to music, Af dances with us”.

**Post:** N.R

**ZM:**

**Pre:** “Music in a video cassette named “Baby Smart”.

**Post:** “No”.

**ZF:**

**Pre:** “No”.

**Post:** “No”.

Does s/he ask to listen to it by

(a) Bringing a CD/tape to you? (i) Yes (ii) No

(b) Turning on the radio/tape/CD player? (i) Yes (ii) No

(c) Other responses. Explanation:

**AyF:**

**Pre:** “She points to the tape recorder and makes movements of a dance, and hand movements as if she is playing an instrument, and she does “la la la” with her mouth”.

**Post:** “Sometimes she takes me to where the tape recorder is and wants me to pick her up so that she can turn it on, and then she begins to dance, etc”.

**AyM:**

**Pre:** “When we turn on the tape recorder, she asks us to come and dance with her”.

**Post:** “She asks us to come and dance with her”.

**OF:**

**Pre:** "She turns on the volume of the computer speakers more".

**Post:** "When the computer is on, she goes and turns on the volume even more".

**OM:**

**Pre:** "She points at the tape recorder".

**Post:** N.R.

**AfM:**

**Pre:** "He points to the CD player so that we will turn it on".

**Post:** N.R

**ZM:**

**Pre:** N.R

**Post:** "She turns it on and plays the keyboard with no discrimination and turns on the buttons for background music".

**ZF:**

**Pre:** N.R

**Post:** "She turns on the electronic keyboard".

4. Are there certain musical sounds or music that your child seems to dislike?

(a) Yes (b) No

If 'Yes', what sounds or music?

**ZM:**

**Pre:** "Unknown".

**Post:** "Songs in languages other than Hebrew on the radio".

**ZF:**

**Pre:** "In my opinion, she doesn't listen to music".

**Post:** - "No".

How does s/he show her/his dislike?

**ZM:**

**Pre:** N.R

**Post:** "She asks to turn off the radio".

5\*. Are there particular types of music activities or types of listening situations that enhance musical enjoyment for your child? For example, a quiet listening environment, good quality sound equipment, live vs. recorded music, type of music or instrument, volume of music, etc. (a) Yes (b) No

If 'Yes' please explain:

**AyF:**

**Pre:** "She wants the music to be louder, not soft".

**Post:** N.R

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\* This question was copied from Gfeller et al. (1999), Appendix 1.

**CF:**

**Pre:** "Soft music. If the music is too loud, she takes off the CI".

**Post:** "There isn't a specific situation that enhances her enjoyment, because she always likes music. Soft music".

**CM:**

**Pre:** "A quiet listening environment. If the tape recorder is too loud - she takes off the CI".

**Post:** "She likes that the music won't be too loud".

**AfM:**

**Pre:** "Af mostly enjoys children's songs played on the CD player, mainly when we dance with him. He likes also songs with movements (such as "Yadain lemaala")".

**Post:** N.R

**ZM:**

**Pre:** "In the afternoon- a quiet listening environment, and mainly video cassettes (music and movie clips)".

**Post:** "In the afternoon she sometimes likes to play the electronic keyboard".

**ZF:**

**Pre:** N.R

**Post:** "In the kindergarten she likes to play the guitar. At home – no".

**6\*.** Are there particular types of music activities or types of listening situations that make music less enjoyable for your child? For example, competing noise, poor quality sound equipment, live vs. recorded music, type of music or instrument, etc.

(a) Yes (b) No

If 'Yes', please explain:

**CF:**

**Pre:** "If the music is too loud, she doesn't want".

**Post:** "Noise disturbs her".

**CM:**

**Pre:** "Loud music. If the tape recorder is too loud - she takes off the external part of the cochlear implant".

**Post:** "Loud noise".

**AfF:**

**Pre:** "Competing sound that disturbs his listening".

**Post:** N.R

**ZM:**

**Pre:** "Not known. When she doesn't like it - she ignores".

**Post:** "She doesn't like music on the radio (music which is unfamiliar to her), and it seems as if it disturbs her from enjoying video cassettes".

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\* This question was copied from Gfeller et al. (1999), Appendix 1.

**ZF:**

**Pre:** "She doesn't feel the difference".

**Post:** "I have no idea".

7. Do you try to sing to your child?

Never   Seldom   Occasionally   Frequently   Almost always

If you do, can you give some examples of these songs?

**OF:**

**Pre:** "Uga, Uga".

**Post:** "Uga uga".

**OM:**

**Pre:** "Children's songs".

**Post:** "Children's songs".

**CF:**

**Pre:** "Children's songs: Haoto shelanu, red eleinu aviron, chanukia yefeifia, sevivon sov sov sov, tzfardea yeruka".

**Post:** "Children's songs: Eser etzbaot li yesh, haoto shelanu gadol veyarok, etc".

**CM:**

**Pre:** "Red eleinu aviron, ladod mosheh haita para, tzfardea yeruka".

**Post:** "Tzfardea yeruka, ladod mosheh haita para, red eleinu aviron, haoto shelanu".

**AfF:**

**Pre:** "Mainly children's songs".

**Post:** "Songs of Zohar Argov".

**AfM:**

**Pre:** "Children's songs such as Yadaim lemaala, etzba leetzba".

**Post:** "Children's songs". "Af's songs", songs that he learned in the kindergarten.

**ZM:**

**Pre:** "Numi numi (before bed time), Shana tova, onia, boker tov".

**Post:** "Numi numi (before bed time), boker tov, chilazon katan, etc. (songs that are sung in the kindergarten and songs that are heard on tape cassettes)".

**ZF:**

**Pre:** "Numi numi, boker tov, etc".

**Post:** "No"

**AyM:**

**Pre:** N.R

**Post:** "Songs with movements. Action songs".

**AyF:**

**Pre:** N.R

**Post:** "I never sang for her, but my wife sometimes sings for her songs such as "Pa, pa, pa, auto ba" and also "Our grass is big and green".

(i) Other responses. Explanation:

**ZM:**

**Pre:** "Usually she responds by sign language, according to what she has learned in the kindergarten".

**Post:** N.R

**OF:**

**Pre:** N.R

**Post:** "If she feels that one sings for her, she cooperates".

**8.** Have you tried to offer the child a cassette tape or a CD with music to listen to?

Never    Seldom    Occasionally    Frequently    Almost always

If you have, what tape(s) and/or CD ('s)?

**CF:**

**Pre:** "Children's songs".

**Post:** "Children's songs".

**CM:**

**Pre:** "Children's songs".

**Post:** "Children's songs".

**AfM:**

**Pre:** "Mainly children's songs and birthday songs, especially as background music when we play together".

**Post:** "Children's songs; Birthday songs".

**ZF:**

**Pre:** "Shabbat songs and birthday songs".

**Post:** "Children's songs. A DVD with songs".

**ZM:**

**Pre:** "A tape of Shabbat songs and a tape of songs that were recorded in her kindergarten".

**Post:** "Familiar children's songs".

**OM:**

**Pre:** "Children's songs".

**Post:** "Children's songs".

How has the child responded to your offer?

**OM:**

**Pre:** "Happily".

**Post:** "Wants to listen".

**CF:**

**Pre:** "She responds positively".

**Post:** “She comes over and listens”.

**CM:**

**Pre:** “She enjoys it very much”.

**Post:** “She is happy”.

**AfM:**

**Pre:** “It doesn’t disturb him”.

**Post:** “He wants to play the CD’s by himself”.

**ZF:**

**Pre:** “She doesn’t respond”.

**Post:** “Positively”.

**ZM:**

**Pre:** “Sometimes she is happy but she loses interest in it quite quickly”.

**Post:** “She is not enthusiastic after a while”.

**9. Pre-intervention question:** Is your child's use of sound games and toys different from how s/he played with them prior to the implantation?

(a) Yes (b) No (c) I have not paid attention to that

If 'Yes', could you please describe it.

**Post-intervention question:** Since the music therapy intervention and play sessions, is your child’s use of sound games and toys different from his/her prior use?

(a) Yes (b) No (c) I have not paid attention to that

If 'Yes', could you please describe it.

Does s/he currently enjoy playing with the sound games and toys for the purpose of producing sounds?

(i) Never   Seldom   Occasionally   Frequently   Almost always

(ii) It is not clear enough whether s/he plays with it in order to produce sounds.

If your answer is positive (i.e., ‘seldom’, ‘occasionally’, ‘frequently’, or ‘almost always’), please explain (what toys/games, when, etc.):

**AyF:**

**Pre:** “She enjoys making sounds by banging on a toy, like playing a drum”.

**Post:** “She plays the xylophone almost every time she sees it. She also plays with other toys that make sounds and greatly enjoys them, also because there are lights in one of these toys”.

**AyM:**

**Pre:** “A toy telephone that plays, and a xylophone that she likes very much”.

**Post:** “She loves playing with a toy that makes sounds as well as lights. Her eyes are shining when she hears!”

**OF:**

**Pre:** “Xylophone”.

**Post:** “She enjoys making sounds from different things, for example, xylophone”.

**OM:**

**Pre:** “Occasionally”.



**Post:** “A cymbal; a flute”.

**CF:**

**Pre:** “She plays with a toy drum, harmonica, a ball with bells, and with maracas”.

**Post:** “A ball with bells inside, a drum, maracas, harmonica”.

**CM:**

**Pre:** “A drum; maracas; a ball with bells inside.

**Post:** Maracas; a drum; a ball with bells inside”.

**AfF:**

**Pre:** “He plays with a police car that makes noise of a siren”.

**Post:** “Electronic keyboard with sounds of animals”.

**AfM:**

**Pre:** “He beats the drum, he makes noise with different things on the floor, with teaspoons on the table, everything that he can beat with and hear a sound”.

**Post:** “He has a plastic duck that makes different melodies. In the past he didn’t relate to it. Now he plays with it”.

**ZF:**

**Pre:** “Sounds from a book named “Pinuky is looking and listening”.

**Post:** N.R

**ZM:**

**Pre:** “There are toys that make sounds: a cat (a bell), a dog (barks) and an elephant “.

**Post:** “Currently she is playing with toys that have bells inside them, something that she couldn’t know about before”.

**10.** Have you ever tried to offer your child headphones to wear for listening to music?

Never   Seldom   Occasionally   Frequently   Almost always

If you have, can you describe the child's reaction?

**CF:**

**Pre:** “She takes the headphones by herself. She responds with hand movements and continues listening”.

**Post:** N.R

**OF:**

**Pre:** N.R

**Post:** “With a CI it’s impossible to wear headphones”.

What type of headphones did you use?

**CF:**

**Pre:** Simple ones.

**Post:** N.R

**11.** Is there another member of the family besides parents (such as sister or brother, grandmother grandfather, etc) who provides the child with an additional musical experience (including singing)?

(a) Yes (b) No

If 'Yes', who is that person (or persons)?

**OF:**

**Pre:** "Grandma".

**Post:** "Grandma".

**OM:**

**Pre:** "Grandma".

**Post:** "Grandma, her brother and her sister".

**CF:**

**Pre:** "Grandma- a little bit".

**Post:** "Grandma".

**CM:**

**Pre:** "Grandma".

**Post:** "Grandma".

**AfM:**

**Pre:** "His sister. Af is very attached to her".

**Post:** "His sister, together with me and sometimes by herself".

**ZM:**

**Pre:** "An aunt".

**Post:** "Aunts (in the presence of the parents)".

What kind of experience(s)?

**OF:**

**Pre:** "She sings for her and also puts on music for her to listen to".

**Post:** "She sings for her quite a lot".

**OM:**

**Pre:** "She uses simple percussion, sings for her, and turns on the TV so she can hear music".

**Post:** "Her brother and sister sing and she joins in".

**CF:**

**Pre:** "Children's songs, such as "tzif zipor," etc".

**Post:** "She sings for her".

**CM:**

**Pre:** "She sings familiar children's songs".

**Post:** "She sings children's songs for her".

**AfM:**

**Pre:** "She sings for him".

**Post:** "She offers him musical instruments and children's songs from the kindergarten".

**ZM:**

**Pre:** "Singing and dancing (accompanied by a tape)".

**Post:** "Playing the electronic keyboard".

How does the child respond to that?

**OF:**

**Pre:** "With joy".

**Post:** "O dances and tries to sing".

**OM:**

**Pre:** "With joy, with will. She loves it".

**Post:** "Very happily".

**CF:**

**Pre:** "Usually OK".

**Post:** "She is happy".

**CM:**

**Pre:** "Happily".

**Post:** "Happily, joyfully".

**AfM:**

**Pre:** "He smiles and he is happy".

**Post:** "Sometimes he agrees and sometimes he wants to take over".

**ZM:**

**Pre:** "Happily".

**Post:** "Happily".

**12.** If you have any further comments, which you think might shed additional light on your child's musical behavior, please add them:

**OM:**

**Pre:** "O loves music. The moment she hears something, even if it's just a song, she starts moving her body and clapping hands".

**Post:** "O in general loves music and she moves with every sound that sounds as a song or music to her. She looks at the mirror and tries to sing".

**OF:**

**Pre:** N.R

**Post:** "My child loves music very much, mostly when it is accompanied by movement".

**ZM:**

**Pre:** "Usually, music which is heard not on TV doesn't interest her for a long time. She enjoys music a longer period of time when it is accompanied by dances and joyful movements (on a video cassette)".

**Post:** “The main enjoyment is from music which accompanies video cassettes. In addition, she loves musical toys (something that she couldn’t enjoy before)”.

**AfM:**

**Pre:** N.R

**Post:** “Since the research has started, I paid attention to the fact that Af likes to take sticks or bottles and hit the door with them in order to hear sounds, or to make things fall on the floor, to hear their sounds”.

**AyM:**

**Pre:** N.R

**Post:** “Ay is happy to hear melodies and very excited to see an electronic keyboard. She then tries to play it, and I can see more and more progress and curiosity”.

**AyF:**

**Pre:** N.R

**Post:** “Ay greatly enjoys every kind of music, mainly when one dances with her. Sometimes she even calls me to dance with her at home”.

**CF:**

**Pre:** N.R

**Post:** “She enjoys the hearing more”.

**CM:**

**Pre:** N.R

**Post:** “She enjoys music very much”.

**13. (Pre-intervention):** In the light of the explanations you received before you signed the consent form, what expectations do you have from this research?

**AyF:** “We would like her to enjoy the research as well as listen to all the sounds of music, and that she would tell us what tape or what kind of music she wants”.

**AyM:** “That Ay will like music and will enjoy it”.

**OF:** “That O will like music and will enjoy it”.

**OM:** “...that she will enjoy, that it will succeed. And if it helps children with CI- we will be happy”.

**CF:** “No special expectation. That she will enjoy”.

**CM:** “...that the girl will enjoy the experiences that she hasn’t experienced before, for her pleasure”.

**AfF:** “That the research would help him discern sounds and that he would have his preferences in music”.

**AfM:** “I hope that the research will encourage him to listen to music, that it will contribute to his hearing and will present him with different timbres of music. That he will know how to direct us to his preferences in music. It’s true that he is now little”.

**ZF:** “That my daughter will receive much enjoyment from music”.

**ZM:** “That it will help Z to enjoy music”.

**13. (Post-intervention):** Your expectations prior to the start of the research were as follows: “.....” (Copied from the questionnaire that was filled out before the research began). According to what you have seen so far, were these expectations fulfilled? Please explain:

**OF:** “Yes. I think she enjoyed it a lot”.

**OM:** “Yes. She enjoyed it very much”.

**AfM:** “Yes. Af wants more to listen to songs, and to play. He pays more attention to the melodies and sounds that he hears (maybe also due to his level of hearing with the CI) and I know he enjoys it very much”.

**AfF:** “Part of my expectations has been fulfilled but still he has to work in order to progress”.

**AyM:** “Yes, very much. We enjoyed it very much and Ay has made a lot of progress. Thanks for the patience”.

**AyF:** “Yes. Every time Ay came home from the session she looked the happiest child in the world. I am also sure that it helped her a lot in listening to soft sounds, and mainly, to get used to listen in noisy environment, when there is a wedding, for example. Then, she enjoys standing near the drummers and the other players. Thanks very much”.

**ZM:** “I am not fully sure whether her additional liking for music is due to the research or to the improvement in her hearing”.

**ZF:** “Not enough”.

**CF:** “Definitely”.

**CM:** “She absolutely enjoyed the music sessions”.

## Appendix T

### Parent interviews: Responses grouped according to themes

**Note:** Frequently, the parent's response embraces more than one theme. These themes appear in brackets at the beginning of each parent's response. The first theme in brackets is the theme under consideration in the chapter being discussed. Other themes follow.

#### **Abbreviations:**

AfF = Af's father.

AfM = Af's mother.

OF = O's father.

OM = O's mother.

AyF = Ay's father

AyM = Ay's mother

CM = C's mother.

#### **Theme 1a**

(1a; 3c) When one presents him with an initial challenge he jumps right in and immediately tries to cope with it and one could see it there. This, I know, characterizes me (AfF).

(3a; 6a; 1a; 1b) The part with the cymbal. There was something about the way he is, that he goes along with all his strength. This is Af, in this part (AfM).

#### **Theme 1b**

(1b; 6a) And when she took the drum sticks "So I want this" and you understand that it's O (OM).

(3a; 6a; 1a; 1b) The part with the cymbal. There was something about the way he is, that he goes along with all his strength. This is Af, in this part (AfM).

(6a; 1b) **Mother:** To participate, to take... to be in control of everything. It was very much...

**Interviewer:** It was similar.

**Mother:** Indeed, similar (AfM).

(1b; 3a; 3e) I know very well his independence and his... he knows how to take control of things sometimes. Really. Everything (AfM).

(3d; 6a; 1b) I expected him more to take over, because usually when there are things he likes he wants to have control. "I am here and I decide", like with the cymbal, I saw that he was enjoying it so he took over and said: it will be like this. Although he did participate with Dikla but he took over more (AfM).

(1b) With the songs too, he showed himself, his presence, "this song yes and that song no" (AfM).

(1b; 3b) Yes, but again- I see that when he likes something, he takes control, but from the rest of the things he stays a bit distant. But it is OK; he is still... hmmm... (AfM).

(4b; 2a; 3a; 5a; 1b; 5c)...but now at home he wants more this disk and not that one. Also songs I sing to him, there are some songs he likes better and some less. More than before, beforehand there were times that he didn't want songs at all since he didn't hear them well. I thought he didn't want them because he was hearing them in the kindergarten all day long, but today that he hears better and has done this whole

process with Dikla, I... He wants very much to hear more, more songs. He takes the microphone and in the past he used to be afraid of hearing himself on the loudspeaker, and he really refused to do it, he was really reluctant and today he really wants. He does constantly "la la la" like in the song where she does "la la la" just like this, really (AfM).

(3a; 1b; 3e) It's good when every person insists on his opinion. Of course she imitated Dikla, so it's important that she can insist on her opinion (AyF).

(1b) **Interviewer:** She got enough space.

**Father:** Yes. She was sure that when she wants the stick – she gets it. It can't go to someone else (OF).

(1b; 6a; 3d) This is an example, that at home she has little patience. She wants to be first, she wants... it is very seldom that she waits to see what I do in order to... except for the first time, on the first time she waits but not more. As a principle. But the thing of knocking she will wait if she knows I try to do something with her, but she will lose her concentration a bit faster in my opinion (OF).

(1b; 3d) I expected her to be as I said, taking more initiative, but she really waited and wanted to see what is expected of her. Yes. Usually she would say "here" and she would decide what she does next... if she would tell her the way she said to play the small drum – then she did knock on the small drum. When she told her cymbals- she moved to the cymbals so understandingly she was there and she did this on all possible places (OF).

(1b) It is very clearly demonstrated that she wanted control over the situation (AyM).

(1b) Ay presses her, OK, but it's not something terrible. Ay presses... (AyM).

(1b) Yes, that's true. That's part of her character. To give it to her, not all the time, but a lot (AyM).

(3b; 6a; 1b) One should understand her, and give her what she needs, this control over. I see- it was also in the past and today as well (AyM).

(6b; 1b) **Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Mother:** The fact that Dikla gave in the beginning... To tell you the truth, that was all the way through. That Ay will do first. Usually, as a mother, I am the one who decides more what we'll do. OK, now we'll sit down and draw. Or- Let's sit down and you will do, you will be the spinning-top and I... As if to give her the... The truth is that yesterday I did exactly this and I saw- it was really cool. I didn't have the energy to be the one who gives the direction at home. I was sitting on the sofa and doing nothing, and the children directed me and it was very nice. So here I saw it more, that it's possible to do it many times. So it won't be exactly as I want now- we will play exactly what she played in the kindergarten. It can be something that she learned a week ago. That she will be the decision maker, that she will do, she will tell me what to do. Sometimes it happens, but it can develop her much more if I give her now to decide as if it was planned on purpose (AyM).

(1b) It's true, that's right, she wants to control over (AyM).

## **Theme 2a**

(3a; 2a; 6a) I don't know... the connection of... that she understood and connected among all the things around (OM).

(4b; 2a; 3a; 5a; 1b; 5c)... but now at home he wants more this disk and not that one. Also songs I sing to him, there are some songs he likes better and some less. More than before, beforehand there were times that he didn't want songs at all since he didn't hear them well. I thought he didn't want them because he was hearing them in

the kindergarten all day long, but today that he hears better and has done this whole process with Dikla, I ... He wants very much to hear more, more songs. He takes the microphone and in the past he used to be afraid of hearing himself on the loudspeaker, and he really refused to do it, he was really reluctant and today he really wants. He does constantly "la la la" like in the song where she does "la la la" just like this, really (AfM).

(4b; 2a; 5c) I remember that at the time Dikla was working with her, suddenly at home she took notice of different kinds of sounds and this was due to the fact that Dikla worked with her on that (AyF).

(2a; 3a) But now I can see that she integrates everything, so I don't have anything specific to work on with her right now (AyF).

(4b; 2a) That means that she perceives, that she knows that sound is something she should show she hears it (AyF).

(3a; 4b; 2a)... kind of you can see that she hears, she reacts to the hearing, that she relates to the things she hears, that there is more connection to hearing; everything is beautiful (OF).

(5d; 2a; 5c) Here, for example, the "ba, ba ,ba" or that of the car I did repeat with her, because I saw that... She goes back to the car, to the picture of the car and it helps her to better internalize it (CM).

### **Theme 3a**

(3a; 6a) For instance, we read a story or a book to him, like the first part where you see that she sings and he knows about the song, so it is the same with books I read to him – he knows every book, everything precisely. It is the same thing (AfF).

(3a) Everything you invest in – it can be good for him (AfF).

(3a; 4b; 5c) This week he took a microphone and started to sing. Really, he started to shout (AfF).

(3a; 2a; 6a) I don't know... the connection of... that she understood and connected among all the things around (OM).

(6a; 3a) First of all, the visual aspect- she sees something and in a second she imitates it. In all areas. It's probably because she hasn't heard, so in the course of time, she has developed this sense (OM).

(3a; 6a) It's fun to see her free like this, and there are lots of things that she does at home in a similar way (OM).

(3a) ... she was very active with her and you see that she flowed along with her very, very nicely (OM).

(3a; 6a; 1a; 1b) The part with the cymbal. There was something about the way he is, that he goes along with all his strength. This is Af, in this part (AfM).

(1b; 3a; 3e) I know very well his independence and his... he knows how to take control of things sometimes. Really. Everything (AfM).

(3a) He gets very enthusiastic about it, and I would love it (AfM).

(5d; 3a) It gave me new ways about how to play more with him, how to get him more involved, although we do play with him a lot, but it is still a pleasure to see him (AfM).

(3e; 3a)... and he has a feel for behaviors. He is the kind of person that knows immediately – this one likes me, that one doesn't, and he saw immediately that she didn't feel like it so he didn't participate at all (AfM).

(4b; 2a; 3a; 5a; 1b; 5c)... but now at home he wants more this disk and not that one. Also songs I sing to him, there are some songs he likes better and some less. More than before, beforehand there were times that he didn't want songs at all since he



didn't hear them well. I thought he didn't want them because he was hearing them in the kindergarten all day long, but today that he hears better and has done this whole process with Dikla, I ... He wants very much to hear more, more songs. He takes the microphone and in the past he used to be afraid of hearing himself on the loudspeaker, and he really refused to do it, he was really reluctant and today he really wants. He does constantly "la la la" like in the song where she does "la la la" just like this, really (AfM).

(3a) Really, it was fun to see this (AfM).

(3a; 1b; 3e) It's good when every person insists on his opinion. Of course she imitated Dikla, so it's important that she can insist on her opinion (AyF).

(2a; 3a) But now I can see that she integrates everything, so I don't have anything specific to work on with her right now (AyF).

(3a; 4b; 2a)...kind of you can see that she hears, she reacts to the hearing, that she relates to the things she hears, that there is more connection to hearing; everything is beautiful (OF).

(3a; 4b) Yes, I think she had a good time (OF).

(3a) **Interviewer:** What was (were) the most enjoyable and/or thrilling moment(s) for you?

**Mother:** The first video segment because one sees that she really talks. Even words. A real communication (CM).

(3a; 3e) **Interviewer:** Why? What was exciting in them?

**Mother:** Just like that, one sees all the communication, the understanding (CM).

(5d; 3a; 5c; 4b) I would show her a car and of course repeat it myself as well. She repeated it many times at home. I was excited because of that. This I really remember, and also the tambourines (The mother shows the movement). That she was... We don't have a tambourine at home. She used to do a certain movement to remind me that she did. It was nice (CM).

(4c; 3a) Now I remembered and got excited again, but of course, when it was real, I also enjoyed it. As if... It was also nice for me to watch (CM).

(3a) **Interviewer:** What was the most enjoyable and/or thrilling moment(s) for you?

**Mother:** When the magnet of the implant fell down.

**Interviewer:** Why?

**Mother:** It was the first time we have seen that. Ay simply told Dikla "one moment" and she put it back on her head and Dikla continued. Ay told Dikla "one moment" as if she didn't want to miss a moment in life (AyM).

(3e; 3a) Ay not only manages in life but she has fun doing it... it's not only the fact that she is getting along, but she gets along with her handicap... She wouldn't miss anything because of this handicap (AyM).

(6a; 3a) The fact that Ay sat with Dikla the way she did and agreed to repeat after her... at home I don't succeed so much. Here I guess she is very focused and she knows that now we sit and... At home I wouldn't succeed so much from the point of view of... as if... because Dikla said to Ay "ah, ah" and she repeated after her. At home I wouldn't succeed doing that... Here she did very nicely, what she doesn't want to do at home (AyM).

(4b; 3a) There are no... There are no words... People always say that music for children with hearing impairments is difficult in a way, because let's say that they hear and do not always know to dance according to the rhythm, but here Dikla made Ay learn it... She learned to hear the rhythm precisely... All the little points... All the... In a very exact way. A thing that... It's fantastic how it will add to her life and

it's for all her life because it was done in such a young age (AyM).

(3a; 4b) You know what, I didn't think at all she will get to this. I was told- OK, the hearing impaired, so they don't like music, so I said: OK, so she won't like music, but a child that loves it so much... It doesn't seem normal to me (AyM).

### **Theme 3b**

(3b) It seems to me all that you've mentioned. She might want a pacifier, or suddenly she became embarrassed, or you suddenly understand that she doesn't feel like doing something (OM).

(3b) The part that was less – with the electronic organ, I don't know, he was involved, not involved. Well, you see, it depends also sometimes on how he got up in the morning, how he behaves on the same day, it changes sometimes (AfM).

(1b; 3b) Yes, but again- I see that when he likes something, he takes control, but from the rest of the things he stays a bit distant. But it is OK, he is still... hmmm... (AfM).

(3b)... how can I explain, as one who knows O, she can talk her head off without any connection, but even this was nice (OF).

(3b)...until she heard... OK, she did hear quickly but until she succeeded functioning... Suddenly, I felt that she was losing an opportunity (AyM).

(3b; 6a; 1b) One should understand her, and give her what she needs, this control over. I see- it was also in the past and today as well (AyM).

### **Theme 3c**

(1a; 3c) When one presents him with an initial challenge he jumps right in and immediately tries to cope with it and one could see it there. This, I know, characterizes me (AfF).

### **Theme 3d**

(3d) **Interviewer:** What moment or part of a session did you like the least?

**Father:** I think – the 6<sup>th</sup> part. In the 6<sup>th</sup> part I could see that he was kind of unclear about what he wanted to do. He was not... He was not focused on anything (AfF).

(3d) ...at home he is a demon (AfF).

(3d) And here he is kind of quiet (AfF).

(3d) It seemed to me a meaningless clip. She imitates her voice (OM).

(3d; 6a) **Mother:**... when he less went along with things. The sixth session, when he made this sound with his voice, was nice, but he was less himself, he was more passive. **Interviewer:** Yes? You felt it was not really him?

**Mother:** Yes (AfM).

(3d)... but still I missed hearing him more (AfM).

(3d; 6a; 1b) I expected him more to take over, because usually when there are things he likes he wants to have control. "I am here and I decide", like with the cymbal, I saw that he was enjoying it so he took over and said: it will be like this. Although he did participate with Dikla but he took over more (AfM).

(3d) It was really... on that day I got a shock. That's it (AfM).

(3d) Here it disturbed me that there was very little talking (AfM).

(1b; 6a; 3d) This is an example, that at home she has little patience. She wants to be first, she wants... it is very seldom that she waits to see what I do in order to ... except for the first time, on the first time she waits but not more. As a principle. But the thing of knocking she will wait if she knows I try to do something with her, but she will lose her concentration a bit faster in my opinion (OF).

(1b; 3d) I expected her to be as I said, taking more initiative, but she really waited and

wanted to see what is expected of her. Yes. Usually she would say "here" and she would decide what she does next... if she would tell her the way she said to play the small drum – then she did knock on the small drum. When she told her cymbals- she moved to the cymbals so understandingly she was there and she did this on all possible places (OF).

(3d) She is more good-hearted than what was seen here (AyM).

### **Theme 3e**

(3e) Yes, she developed it. Her visual sense is very developed (OM).

(1b; 3a; 3e) I know very well his independence and his... he knows how to take control of things sometimes. Really. Everything (AfM).

(3e; 3a)... and he has a feel for behaviors. He is the kind of person that knows immediately – this one likes me, that one doesn't, and he saw immediately that she didn't feel like it so he didn't participate at all (AfM).

(3a; 1b; 3e) It's good when every person insists on his opinion. Of course she imitated Dikla, so it's important that she can insist on her opinion (AyF).

(3a; 3e)**Interviewer:** Why? What was exciting in them?

**Mother:** Just like that, one sees all the communication, the understanding (CM).

(3e; 3a) Ay not only manages in life but she has fun doing it... it's not only the fact that she is getting along, but she gets along with her handicap... She wouldn't miss anything because of this handicap (AyM).

(3e) She needs... she must do what she does up to the end (AyM).

(3e) As much as she is a controller, she very much knows to give up and to do things together (AyM).

### **Theme 4a**

(4a) No, it was cool, and from the beginning, in the beginning I wasn't very anxious but then you say to yourself, what you are getting into; maybe you don't need this mess (OM).

(4a) Really, sincerely, anything that I am told might be good for the child, I agree to it immediately. Kind of – I don't mind. My husband is more reluctant. He says: what does it help? (AfM).

### **Theme 4b**

(3a; 4b; 5c) This week he took a microphone and started to sing. Really, he started to shout (AfF).

(4b) I feel that part of my expectations have been fulfilled but still it is something he has to work on (AfF).

(4b) I feel he discerns but it is not... he needs to work more on it. It is not something that he has fully mastered (AfF).

(4b) Yes, to bring it more deeply to her awareness. Maybe it will help( OM).

(4b) So yes, first of all, she enjoyed. In my opinion, she greatly enjoyed the individual sessions. She has been doing interesting things and yes, musical instruments in general. In general, music is something that should contribute to children with CI, and I think it's... It's enough this experience, this experiment that she went through... Without thinking, but it did do something...(OM)

(4c; 4b) **Interviewer:** What you are actually saying is – It brought to my awareness the importance of making him listen to different kinds of sounds

**Father:** I am sure... 100% sure that it is important (AfF).

(4b)... it was nice, and I even think it was a constructive experience for O, actually a

constructive experience (OM).

(4b; 4d) But it made me see how much he likes playing instruments and how much I would like to invest in this area of playing for him, buy him more instruments, more serious, so that he enjoys it more, because I see he enjoys the drums particularly (AfM).

(4b; 5c) I would say many of them got fulfilled, first because he loves music very much more than at the beginning. You can see the difference between what I wrote down now and at the beginning; it is very different. I see that he is closer to music; he is more interested in listening (AfM).

(4b; 2a; 3a; 5a; 1b; 5c)... but now at home he wants more this disk and not that one. Also songs I sing to him, there are some songs he likes better and some less. More than before, beforehand there were times that he didn't want songs at all since he didn't hear them well. I thought he didn't want them because he was hearing them in the kindergarten all day long, but today that he hears better and has done this whole process with Dikla, I ...He wants very much to hear more, more songs. He takes the microphone and in the past he used to be afraid of hearing himself on the loudspeaker, and he really refused to do it, he was really reluctant and today he really wants. He does constantly "la la la" like in the song where she does "la la la" just like this, really (AfM).

(4b)... and you can see that he gets more enjoyment from playing the music and listening (AfM).

(4b; 2a; 5c) I remember that at the time Dikla was working with her, suddenly at home she took notice of different kinds of sounds and this was due to the fact that Dikla worked with her on that (AyF).

(4b; 2a) That means that she perceives, that she knows that sound is something she should show she hears it (AyF).

(3a; 4b; 2a)...kind of you can see that she hears, she reacts to the hearing, that she relates to the things she hears, that there is more connection to hearing; everything is beautiful (OF).

(3a; 4b) Yes, I think she had a good time (OF).

(5c; 4b) Yes, for example, the "bam, bam, bam" and the one with the microphone and that with the car- She really repeated those at home (CM).

(5d; 3a; 5c; 4b) I would show her a car and of course repeat it myself as well. She repeated it many times at home. I was excited because of that. This I really remember, and also the tambourines (The mother shows the movement). That she was... We don't have a tambourine at home. She used to do a certain movement to remind me that she did. It was nice (CM).

(4b) It's probably important, all the... It really exposed her to the world of sounds (CM).

(4b) It contributed to the child herself, I see it did (CM).

(4b) I see that she enjoys all the experiences with the musical instruments as well as the music. OK, she doesn't have the instruments available for her, and she enjoyed every session. Dikla greatly contributed because she was so nice to her and made her work so nice (CM).

(4b) Because she also came happily, she didn't cry (CM).

(4b; 3a) There are no... There are no words... People always say that music for children with hearing impairments is difficult in a way, because let's say that they hear and do not always know to dance according to the rhythm, but here Dikla made Ay learn it... She learned to hear the rhythm precisely... All the little points... All the... In a very exact way. A thing that... It's fantastic how it will add to her life and

it's for all her life because it was done in such a young age (AyM).

(3a; 4b) You know what, I didn't think at all she will get to this. I was told- OK, the hearing impaired, so they don't like music, so I said: OK, so she won't like music, but a child that loves it so much... It doesn't seem normal to me (AyM).

(6b; 4b; 4c; 6a) Maybe it's a repetition, but I enjoyed it very much the way Dikla... with all the patience... Maybe it's what I said before, that I didn't succeed to sit with Ay and have a conversation... Because usually I would initiate things at home, not her. And this is... as if... patience. Dikla waits until Ay will do... One can see here- until Ay didn't completely finish, Dikla didn't start. There was one time where Ay said to her: "Not you" but during the process you see that Dikla she waits and allows her to do it. It was superior (AyM).

#### **Theme 4c**

(4c; 4b) **Interviewer:** What you are actually saying is – It brought to my awareness the importance of making him listen to different kinds of sounds.

**Father:** I am sure... 100% sure that it is important (AfF).

(4c) But really, no doubt about it, I think this gave us a lot (AfM).

(4c)...only the fact that we enjoyed it very much (AyF).

(4c; 3a) Now I remembered and got excited again, but of course, when it was real, I also enjoyed it. As if... It was also nice for me to watch (CM).

(6b; 4b; 4c; 6a) Maybe it's a repetition, but I enjoyed it very much the way Dikla... with all the patience... Maybe it's what I said before, that I didn't succeed to sit with Ay and have a conversation... Because usually I would initiate things at home, not her. And this is... as if... patience. Dikla waits until Ay will do... One can see here- until Ay didn't completely finish, Dikla didn't start. There was one time where Ay said to her: "Not you" but during the process you see that Dikla she waits and allows her to do it. It was superior (AyM).

#### **Theme 4d**

(4b; 4d) But it made me see how much he likes playing instruments and how much I would like to invest in this area of playing for him, buy him more instruments, more serious, so that he enjoys it more, because I see he enjoys the drums particularly (AfM).

#### **Theme 5a**

(5a; 5c) This whole issue of music at home is not something we reinforce, so maybe in this area we can give her more musical instruments to try and play and see what she'll do, i.e., without guiding her, to give her and see how she will respond. In addition, at our home music is something that is not really... (OM)

(5a; 5c) At home too I see he is constantly looking where to hear sounds from. He even throws things, tosses them, just to hear the sounds (AfM).

#### **Theme 5b**

(5c; 5b) **Interviewer:** While watching the videotapes, did you have any thoughts/memories about your child's **similar** reactions at home? Please explain.

**Mother:** Yes, yes, a lot. With all the video clips. We also have at home music instruments, not real ones but still, he seemed to like them very much (AfM).

### **Theme 5c**

(5c) At home, you play with him some game or something, he finds more sounds, more sounds (AfF).

(3a; 4b; 5c) This week he took a microphone and started to sing. Really, he started to shout (AfF).

(5c) This video clip reminds me of things she is doing at home (OM).

(5a; 5c) This whole issue of music at home is not something we reinforce, so maybe in this area we can give her more musical instruments to try and play and see what she'll do, i.e., without guiding her, to give her and see how she will respond. In addition, at our home music is something that is not really... (OM)

(5c; 5b) We also have at home music instruments, not real ones but still, he seems to like them (AfM).

(5c) Now he constantly seeks to knock on walls, on doorframes, just to hear the sounds (AfM).

(5c) Sometimes, because his sister is around and she loves singing, so maybe he likes also at home to vocalize more (AfM).

(5c) **Mother:** He always shouts and makes more sounds.

**Interviewer:** Much more vocal.

**Mother:** Yes (AfM).

(5a; 5c) At home too I see he is constantly looking where to hear sounds from. He even throws things, tosses them, just to hear the sounds (AfM).

(4b; 5c) I would say many of them got fulfilled, first because he loves music very much more than at the beginning. You can see the difference between what I wrote down now and at the beginning; it is very different. I see that he is closer to music; he is more interested in listening (AfM).

(4b; 2a; 3a; 5a; 1b; 5c)...but now at home he wants more this disk and not that one. Also songs I sing to him, there are some songs he likes better and some less. More than before, beforehand there were times that he didn't want songs at all since he didn't hear them well. I thought he didn't want them because he was hearing them in the kindergarten all day long, but today that he hears better and has done this whole process with Dikla, I... He wants very much to hear more, more songs. He takes the microphone and in the past he used to be afraid of hearing himself on the loudspeaker, and he really refused to do it, he was really reluctant and today he really wants. He does constantly "la la la" like in the song where she does "la la la" just like this, really (AfM).

(5c) We also give him more music, but here it is more professional and there are more real instruments like those of adults, so he also understands that it's not a toy, and at home the instruments are very colorful and here they look more like the real thing (AfM).

(4b; 2a; 5c) I remember that at the time Dikla was working with her, suddenly at home she took notice of different kinds of sounds and this was due to the fact that Dikla worked with her on that (AyF).

(5c) When she was knocking on things, also at her grandmother's she really likes to take a fork and knock on glasses, bottles, and if her grandmother knocks on the upper part of the bottle, she knocks on the lower part, the same thing (OF).

(5d; 5c) Yes, the parts with the music that she copies the sound. The first part of playing to her sounds and she will identify them in the area. The same when she made her hear the dog and she looked for the dog's picture or something close. You can do more with her about this. The truth is that at home we don't work with her so much on these things. We try more speech, you know, but yes, apparently it is a better idea

(OF).

(5c; 4b) Yes, for example, the “bam, bam, bam” and the one with the microphone and that with the car- She really repeated those at home (CM).

(5d; 3a; 5c; 4b) I would show her a car and of course repeat it myself as well. She repeated it many times at home. I was excited because of that. This I really remember, and also the tambourines (The mother shows the movement). That she was... We don't have a tambourine at home. She used to do a certain movement to remind me that she did. It was nice (CM).

(5c) With the tape recorder, for example, it's the same at home. She tries to make it operate, but this is the same (CM).

(5d; 2a; 5c) Here, for example, the “ba ,ba, ba” or that of the car I did repeat with her, because I saw that... She goes back to the car, to the picture of the car and it helps her to better internalize it (CM).

(5c) When she played the electronic keyboard, she started from the first key, and she really, how would I say, continued playing up to the last key (AyM).

(5c)... but vocalized conversation- I wouldn't succeed at home (AyM).

### **Theme 5d**

(5d) What I want to say is that we will try... I, at least, will try to make more sounds for him and I will try to see if he, like he did in the video clips, gets more interested and is more quiet and really listens (AfF).

(5d) Yes, of course. Really. More about the topic of... to get to... play myself and then he will do it too (AfM).

(5d; 3a) It gave me new ways about how to play more with him, how to get him more involved, although we do play with him a lot, but it is still a pleasure to see him (AfM).

(5d) All sounds. To work with her as we did, but yet, here I saw things that she paid more attention to, such as the dog, the tape recorder, those kinds of things (AyF).

(5d; 5c) Yes, the parts with the music that she copies the sound. The first part of playing to her sounds and she will identify them in the area. The same when she made her hear the dog and she looked for the dog's picture or something close. You can do more with her about this. The truth is that at home we don't work with her so much on these things. We try more speech, you know, but yes, apparently it is a better idea (OF).

(5d; 3a; 5c; 4b) I would show her a car and of course repeat it myself as well. She repeated it many times at home. I was excited because of that. This I really remember, and also the tambourines (The mother shows the movement). That she was... We don't have a tambourine at home. She used to do a certain movement to remind me that she did. It was nice (CM).

(5d) I don't have these instruments at home. There was a time when I asked the principal of “Shmayah” that if they have similar instruments in the kindergarten- that she will do it there, but it wasn't like that (CM).

(5d; 2a; 5c) Here, for example, the “ba, ba, ba” or that of the car I did repeat with her, because I saw that... She goes back to the car, to the picture of the car and it helps her to better internalize it (CM).

### **Theme 6a**

(3a; 6a) For instance, we read a story or a book to him, like the first part where you see that she sings and he knows about the song, so it is the same with books I read to him – he knows every book, everything precisely. It is the same thing (AfF).

(3a; 2a; 6a) I don't know... the connection of... that she understood and connected among all the things around (OM).

(6a; 3a) First of all, the visual aspect- she sees something and in a second she imitates it. In all areas. It's probably because she hasn't heard, so in the course of time, she has developed this sense (OM).

(1b; 6a) And when she took the drum sticks "So I want this" and you understand that it's O (OM).

(3a; 6a) It's fun to see her free like this, and there are lots of things that she does at home in a similar way (OM).

(3a; 6a; 1a; 1b) The part with the cymbal. There was something about the way he is, that he goes along with all his strength. This is Af, in this part (AfM).

(3d; 6a) **Mother:**... when he less went along with things. The sixth session, when he made this sound with his voice, was nice, but he was less himself, he was more passive. **Interviewer:** Yes? You felt it was not really him?

**Mother:** Yes (AfM).

(6a; 1b) **Mother:** To participate, to take... to be in control of everything. It was very much...

**Interviewer:** It was similar.

**Mother:** Indeed, similar (AfM).

(3d; 6a; 1b) I expected him more to take over, because usually when there are things he likes he wants to have control. "I am here and I decide", like with the cymbal, I saw that he was enjoying it so he took over and said: it will be like this. Although he did participate with Dikla but he took over more (AfM).

(6a) **Father:** At home she was getting much more angry if we would try to do these things with her (OF).

**Interviewer:** Less patient?

**Father:** Less patient and she wouldn't let us do it. Here nobody got close to her. At home apparently, somebody was getting close to her, and she was more kind of under pressure because of the preserving of her territory. But here she seems more relaxed and... (OF).

(1b; 6a; 3d) This is an example, that at home she has little patience. She wants to be first, she wants... it is very seldom that she waits to see what I do in order to... except for the first time, on the first time she waits but not more. As a principle. But the thing of knocking she will wait if she knows I try to do something with her, but she will lose her concentration a bit faster in my opinion (OF).

(6a; 3a) The fact that Ay sat with Dikla the way she did and agreed to repeat after her... at home I don't succeed so much. Here I guess she is very focused and she knows that now we sit and... At home I wouldn't succeed so much from the point of view of... as if... because Dikla said to Ay "ah, ah" and she repeated after her. At home I wouldn't succeed doing that... Here she did very nicely, what she doesn't want to do at home (AyM).

(3b; 6a; 1b) One should understand her, and give her what she needs, this control over. I see- it was also in the past and today as well (AyM).

(6b; 4b; 4c; 6a) Maybe it's a repetition, but I enjoyed it very much the way Dikla... with all the patience... Maybe it's what I said before, that I didn't succeed to sit with Ay and have a conversation... Because usually I would initiate things at home, not her. And this is... as if... patience. Dikla waits until Ay will do... One can see here- until Ay didn't completely finish, Dikla didn't start. There was one time where Ay said to her: "Not you" but during the process you see that Dikla she waits and allows her to do it. It was superior (AyM).



**Theme 6b**

(6b; 1b) **Interviewer:** Does anything that you just saw give you ideas about how to help your child?

**Mother:** The fact that Dikla gave in the beginning... To tell you the truth, that was all the way through. That Ay will do first. Usually, as a mother, I am the one who decides more what we'll do. OK, now we'll sit down and draw. Or- Let's sit down and you will do, you will be the spinning-top and I... As if to give her the... The truth is that yesterday I did exactly this and I saw- it was really cool. I didn't have the energy to be the one who gives the direction at home. I was sitting on the sofa and doing nothing, and the children directed me and it was very nice. So here I saw it more, that it's possible to do it many times. So it won't be exactly as I want now- we will play exactly what she played in the kindergarten. It can be something that she learned a week ago. That she will be the decision maker, that she will do, she will tell me what to do. Sometimes it happens, but it can develop her much more if I give her now to decide as if it was planned on purpose (AyM).

(6b; 4b; 4c; 6a) Maybe it's a repetition, but I enjoyed it very much the way Dikla,... with all the patience... Maybe it's what I said before, that I didn't succeed to sit with Ay and have a conversation... Because usually I would initiate things at home, not her. And this is... as if... patience. Dikla waits until Ay will do... One can see here- until Ay didn't completely finish, Dikla didn't start. There was one time where Ay said to her: "Not you" but during the process you see that Dikla she waits and allows her to do it. It was superior (AyM).

## Appendix U

### Parent-Child ERA: Inter-observer reliability

subject	session part	angry1	angry2	depressed1	depressed2	anxious 1	anxious 2	enthusiastic1	enthusiastic2	phys.cont.pos1	phys.cont.pos2	phys.cont.neg1	phys.cont.neg2	cont.resp.pos1	cont.resp.pos2	cont.resp.neg1	cont.resp.neg2	struct.med1	struct.med2	readchildnes1	readchildnes2	mirroring1	mirroring2	flexibility1	flexibility2	intrusiveness1	intrusiveness2	cons.predict1	cons.predict2
Ay	D	5	5	5	5	5	5	5	5	.	.	5	5	5	5	5	.	5	5	4	5	5	5	5	4	4	4	5	5
	U	5	5	5	5	5	5	5	5	.	.	5	5	5	5	5	.	5	4	5	5	5	5	5	4	5	5	5	5
O	D	5	5	5	5	5	5	5	4	2	.	5	5	5	5	.	.	5	5	4	5	5	5	5	5	5	5	5	5
	U	5	5	5	5	5	5	5	4	2	.	5	5	5	4	.	.	5	5	5	5	5	4	5	5	5	5	5	5
Af	D	5	5	4	5	4	5	5	5	2	.	5	5	5	5	.	.	4	5	4	5	5	4	5	5	5	5	5	5
	U	4	5	5	5	5	4	5	5	.	.	4	5	5	5	5	.	5	5	4	5	5	5	5	4	4	4	4	5
C	D	5	5	5	5	5	5	4	5	.	2	5	5	4	5	.	.	4	4	4	5	4	4	5	4	5	4	5	5
	U	5	5	5	5	5	5	5	4	.	2	5	5	5	5	.	.	5	5	4	5	5	4	5	5	4	5	5	5
Z	D	5	5	5	5	5	5	5	5	.	.	5	5	5	5	.	.	5	5	4	5	5	5	5	5	5	5	5	5
	U	5	5	5	5	5	5	5	5	.	.	5	5	5	5	.	.	5	5	5	5	5	5	5	5	4	4	5	5

#### Coding

- **Session part (either music therapy or play):** D= Directed session part; U= Undirected session part.
- **Items for rating:** (see these items in detail in Appendix K): angry; depressed; anxious; enthusiastic; physical contact-positive/negative; contingent responsivity- negative/positive; structures and mediates environment; read child's cues; mirroring; flexibility/rigidity; intrusiveness; consistency/predictability.
- The dots in the boxes present items which were not ratable (see instructions for raters in Appendix K).
- The numbers 1 and 2, which appear near each item, present the ratings of observer 1 or 2, respectively.



## Appendix V: Parent-Child ERA analysis

subject	session part	Item															
		angry	depressed	anxious	enthusiastic	phys.cont.pos	phys.cont.neg	cont.resp.pos	cont.resp.neg	structuring	readchildcn	mirroring	flexibility	intrusiveness	cons.predict	angry	depressed
Ay	DP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	DM	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5
	UM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
O	DP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	DM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Af	DP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	DM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
C	DP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	DM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Z	DP	4	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5
	UP	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	DM	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	UM	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5

■ Session part: DP= Directed play; UP= Undirected play; DM= Directed music therapy; UM= Undirected music therapy

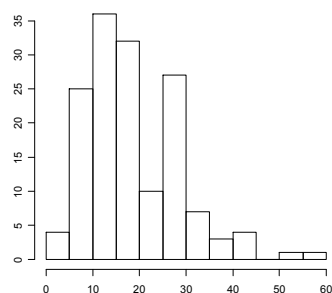
■ The dots in the boxes present items which were not ratable (see instructions for raters in Appendix K). The items are presented in detail in Appendix K.



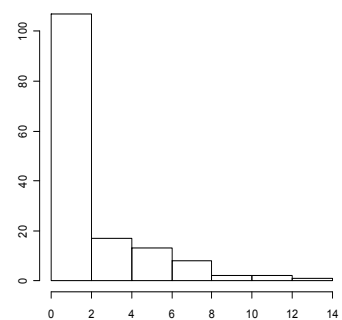
## Appendix W

### Data screening for frequency and duration measures from the video analysis

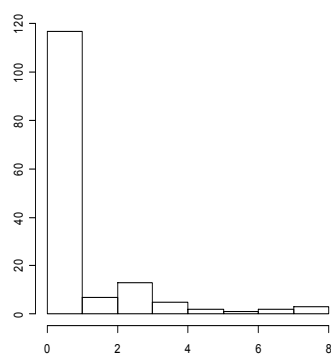
**Spontaneous initiation**



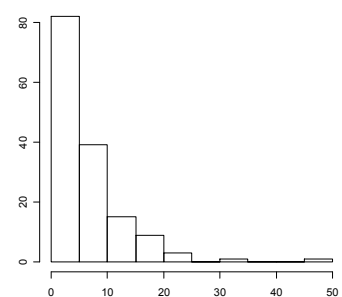
**Spontaneous imitation**



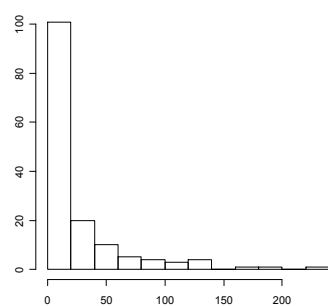
**Spontaneous  
synchronization**



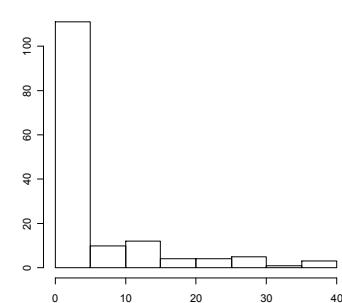
**Spontaneous turn-taking**

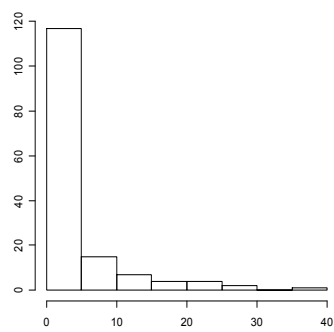


**Duration of spontaneous  
turn-taking**



**Duration of spontaneous  
synchronization**



**Number of events of  
turn-taking**

## Appendix X

### Main session analysis: ANOVA for frequency and duration data

#### **Frequency of spontaneous imitation**

	numDF	denDF	F-value	p-value
(Intercept)	1	141	415.7087	<.0001
CONDITION	1	141	70.6116	<.0001
SESSION PART	1	141	2.9008	0.0907
COND:SESSPART	1	141	0.2229	0.6375

#### **Frequency of spontaneous initiation**

	numDF	denDF	F-value	p-value
(Intercept)	1	141	7923.679	<.0001
CONDITION	1	141	74.653	<.0001
SESSION PART	1	141	3.550	0.0616
COND:SESS PART	1	141	1.835	0.1777

#### **Frequency of spontaneous turn-taking**

	numDF	denDF	F-value	p-value
(Intercept)	1	141	18.96230	<.0001
CONDITION	1	141	45.94520	<.0001
SESSION PART	1	141	6.48747	0.0119
COND:SESS PART	1	141	2.66665	0.1047

#### **Frequency of spontaneous synchronization**

	numDF	denDF	F-value	p-value
(Intercept)	1	141	12.71364	0.0005
CONDITION	1	141	49.07949	<.0001
SESSION PART	1	141	1.54499	0.2159
COND:SESS PART	1	141	0.36252	0.5481

#### **Duration of spontaneous synchronization**

	numDF	denDF	F-value	p-value
(Intercept)	1	141	110.06848	<.0001
CONDITION	1	141	36.02345	<.0001
SESSION PART	1	141	1.00815	0.3171
COND:SESS PART	1	141	0.16126	0.6886



**Duration of spontaneous turn-taking**

	numDF	denDF	F-value	p-value
CONDITION	1	141	35.49839	<.0001
SESSION PART	1	141	11.54614	0.0009
COND:SESS PART	1	141	0.05103	0.8216

**Number of events of spontaneous turn-taking**

	numDF	denDF	F-value	p-value
(Intercept	1	141	39.03427	<.0001
CONDITION	1	141	30.44568	<.0001
SESSION PART	1	141	7.30499	0.0077
COND:SESS PART	1	141	0.51968	0.4722

## Appendix Y

### Parental anecdotes

(About one year after the clinical trials were over)

1. Af goes close to the refrigerator, and suddenly, the magnet of the external part of the CI sticks to the refrigerator. Af says to his mom: "Mom, the implant is hungry".
2. Ay walks outside with her mom and goes near a metal fence. The magnet of the CI sticks to the fence and she says to her mom: "Mom, now I don't hear anything, the fence hears!"
3. Ay's brother gets syrup (medicine) from his mom and cries. Ay's sister, who is hard-of-hearing, stands near her brother, turns off her hearing aid and hardly hears her brother's cry. Ay asks her mother: "Mom, what about me, how do I turn off the implant?" The mother says to her: "Take off the magnet and then you won't hear anything". Ay, excited, takes off the external part of the CI, and comes closer to her brother to see whether she can hear anything. Then she says to her mother: "It's not bad that you cannot take off the implant. Put your fingers on your ears and you won't hear the cry as well, OK?"
4. Ay's mother speaks with her friend, and Ay wants to tell her something but mom is busy talking. Ay says: "Mom, mom, you do not hear; Maybe we will make a surgery for you and we will buy you a CI..."
5. Ay's sister sings a funny song. Ay tells her: "Enough, stop singing!". Her sister doesn't stop. "OK, sing what you want to sing and I will take off the implant!".
6. Recently, when O goes to bed, she doesn't want to take off the external part of the CI. When her mom asks her why, she says: "The implant doesn't want to sleep".
7. One day the CI didn't work. O was without it for hours while her father took it to Haifa to have it repaired. When her grandmother asked her where her CI was, she said: "The implant is sick. It went to the doctor".

